To no

FOOD INDUSTRIES

NUMBER 1

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is going to be like every other year because it will be different, for man's activities and business constantly change. + Only that man or that business which can develop with the times can succeed. + Research is the surest method of adapting business to change. It is a means of accelerating experience—of testing today the ideas to be used tomorrow. + In the hands of the executive who knows how to use it, research is his insurance of profits. + To an understanding of research in its broadest sense and its industrial uses this number is dedicated.

JAN 19 1931
GENERAL INSPECTION
RECEIVED

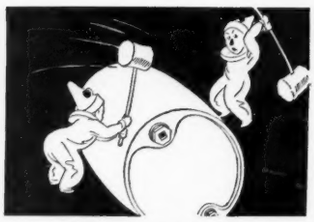
JAN 19 1931
GENERAL INSPECTION
RECEIVED

JANUARY, 1931

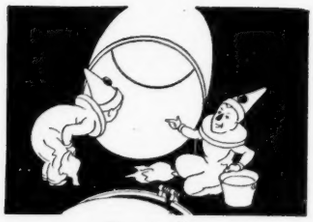
It's easy to see why Hackney Steel Barrels and Drums make for lower shipping costs, neater looking packages, easier handling and greater safety enroute.

And why they are used by such industrial leaders as—

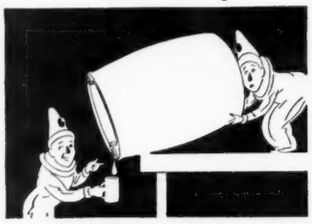
Colgate-Palmolive-Peet, Wadham's Oil, Commonwealth Edison, Sherwin-Williams, Nickel Plate R. R., Eastman Kodak, Hercules Powder, Buick Motor, C. B. & Q. R. R., Air Reduction Sales, Vacuum Oil, Procter & Gamble, Du Pont, A. T. & S. F. R. R., Pittsburgh Plate Glass, and many more.



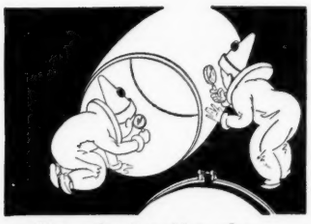
Takes the Hard Knocks
Without Denting



Easy to Clean



To the Last Drop

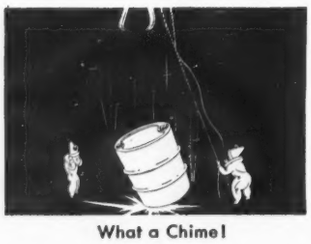


Not a Crevice—Not a Seam
Not an Inward Projection

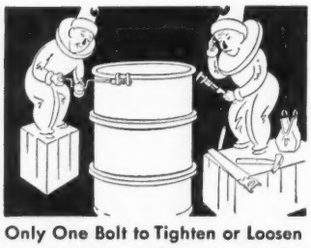
Attractive

No Obstructions

IT'S EASY TO SEE

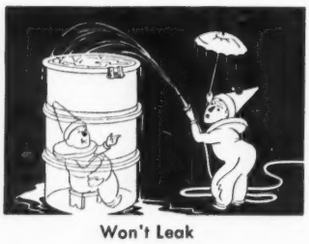


What a Chime!



Only One Bolt to Tighten or Loosen

Ice Can't Form Over the Raised Openings



Won't Leak

No Leakage Inside
Even With the Bungs Open

Stirs—To the Bottom of the Chime

Your inquiry regarding the relative costs of shipping in Hackney Steel Barrels and Drums vs. other types of shipping containers will receive our courteous attention.

Write for the catalog giving complete details on Hackney steel containers today.

PRESSED STEEL TANK COMPANY
1173 Continental Bank Bldg., Chicago
1349 Vanderbilt Concourse Bldg., New York City
5771 Greenfield Avenue, Milwaukee, Wis.
477 Roosevelt Bldg., Los Angeles

Hackney
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VOLUME 3

FOOD INDUSTRIES

NUMBER 1

The Journal Devoted to the Problems of the Food Manufacturer

Contents for January, 1931

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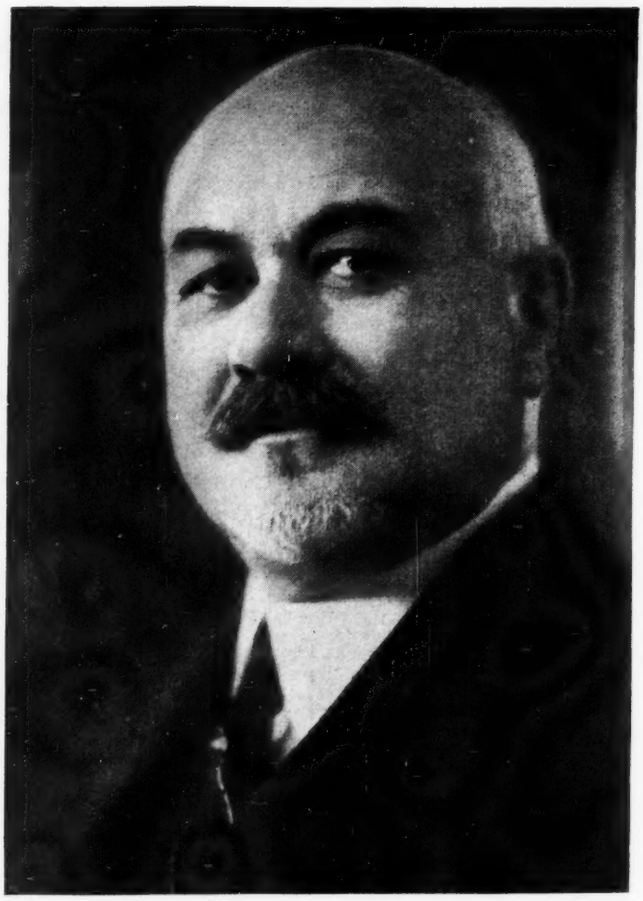
OVERWEIGHT *lost profits . . .* UNDERWEIGHT *lost prestige . . .* . . . both must be guarded against!

TODAY more than ever, the highest degree of packaging efficiency is necessary to protect the narrow profit margins of mass production. Packaging must be done speedily, and most of all with hair splitting accuracy—to prevent overweight that wipes out or reduces your slim margin of profit—or underweight that jeopardizes your priceless good will.

Every manufacturer of package goods has the same problem and the great majority of them are solving it through the use of Pneumatic Scale Packaging Machinery. Like The R. T. French Company, makers of the famous French's Mustard and Spices, America's leading producers, almost without exception, use Pneumatic Machines because they offer the "perfectly balanced combination of two great features—speed with accuracy."

Send for the book "An Interview". It will convince you (in five minutes' reading time) of Pneumatic's ability to help you.



F. J. FRENCH

PRESIDENT, THE R T. FRENCH COMPANY

"A manufacturer cannot afford to short weight either his customers or himself. Overweight means lost profits, underweight, lost prestige. Therefore he must have absolute dependability in his packaging operations—a perfectly balanced combination of speed, with accuracy. Pneumatic Machines give us that combination."

PNEUMATIC MACHINES

Carton Feeders—Bottom Sealers—Lining Machines Weighing Machines (Net and Gross)—Top Sealers Wrapping Machines (Tight and Wax)—Capping Machines—Labeling Machines—Vacuum Filling Machines (for liquids or semi-liquids)—Automatic Capping Machines—Automatic Cap Feeding Machines—Tea Ball Machines.

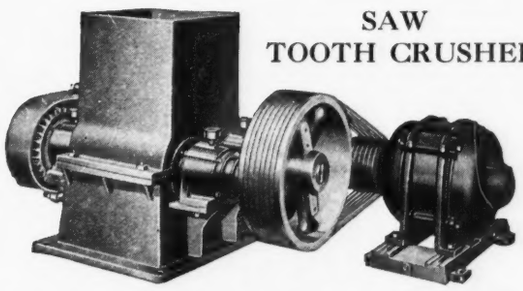
PNEUMATIC SCALE PACKAGING MACHINERY

PNEUMATIC SCALE CORP., LTD., NORFOLK DOWNS, MASS.
Branch Offices in New York, 26 Cortlandt St.; Chicago, 360 North Michigan Ave.; San Francisco, 320 Market St.; Melbourne, Victoria; Sydney, N. S. W. and 9 Whitehall, London, England

IMPORTANT STEPS IN THE PROCESSING OF FOOD PRODUCTS

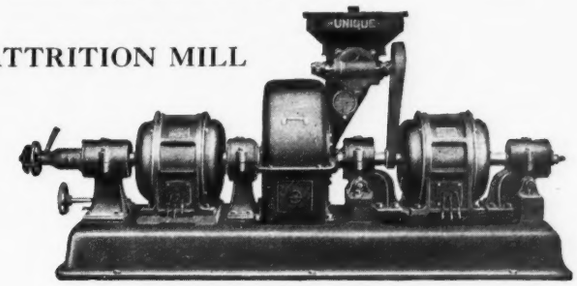
CRUSHING — GRINDING — PULVERIZING — PROPORTIONING — SIFTING — MIXING

SAW TOOTH CRUSHER



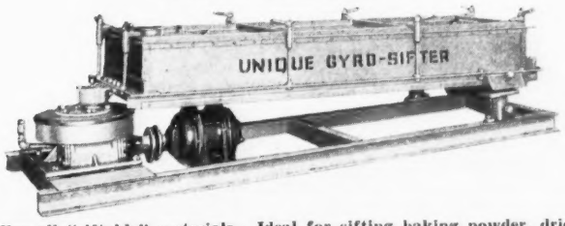
Reduces all types of lumpy products to a finish or preparatory to feeding into fine grinding machines.

ATTRITION MILL



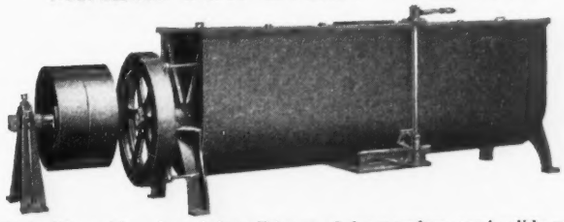
Grinds and pulverizes sugar, spices, all kinds of cereals, etc. More than 2000 in successful operation.

THE GYRO-SIFTER



For all "siftable" materials. Ideal for sifting baking powder, dried eggs, milk powder, spices, salt, soda, etc. Built for making 1 to 5 separations. Many sizes.

MIXERS FOR EVERY PURPOSE



We build machines for mixing all types of dry powders, semi-solids, and liquids. Our line is the most extensive ever offered to the industries.

AND for each step there is a UNIQUE Machine of proven merit—proven by actual successful operation on hundreds of food products and under all kinds of operating conditions.

Constant uniformity in production and efficient, economical operation are paramount qualities to the success of every Food Processing Plant and they are assured through the operation of UNIQUE Process Equipment.

Let us show you how ROBINSON Engineers, with a background of more than thirty years of experience in the Food Industries, can adapt UNIQUE Machinery and Material Handling Equipment to successful production in YOUR Plant. They have given this service to many of the Country's finest and largest Food Processing Plants and will welcome the opportunity to assist in solving your problems.

Write for Literature TODAY.

UNIQUE

ROBINSON MFG. CO.

71 PAINTER ST. — MUNCY, PA.

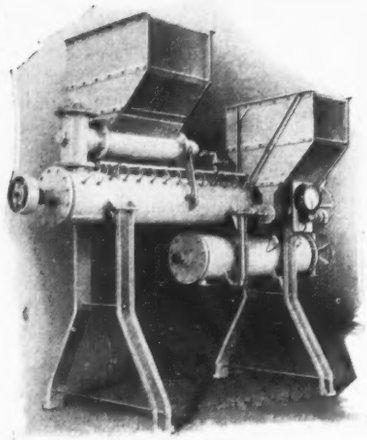
Announcing

NEW GLASS LINED FOOD MACHINERY

See Booth No. 21

NATIONAL CANNERS' CONVENTION, HOTEL STEVENS

PFAUDLER



Actual photograph of new Pfaudler Glass Lined Apple Sauce Machine which has demonstrated, after years of experimentation, that it will produce a finished apple sauce almost as white as the original apples. See it at the Show!

** New **

APPLE SAUCE MACHINE

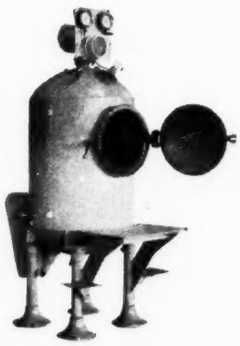
Pfaudler announces a new method of making apple sauce which produces a finished product having approximately the same white color as the original apples. The apples are cooked in a glass lined cooking chamber by low pressure steam. The sugar is added after the cooking operation is completed. Capacity range—1500 to 2500 cases of No. 2 cans per nine hour day. Several machines now in service producing a high quality product.

CORN COOKER

Working with Sprague Sells engineers, Pfaudler now offers a glass lined corn mixer—cooker, 600 gallons in capacity. Four of these were in service last season at the Minnesota Valley Canning Co., Blue Earth, Minn. Further announcements will follow. See this machine at the Show or send for Bulletin.

VACUUM PAN

A new 50-gallon Pfaudler Vacuum Pan known as Model "D" is now offered the Preserving Industry. It is designed for the concentration of fountain syrups and fruit juices. It is equipped with a bronze basket-type coil which fits the contour of the bottom head; also a direct motor-driven agitator which permits the processing of small batches.



New Pfaudler Model "D" Vacuum Pan, 50 gallons capacity. Designed for the concentration of soda fountain syrups and fruit juices.

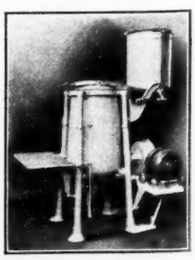
MAYONNAISE MIXER

One of the outstanding features of the new Mayonnaise Mixer is its large capacity, triple that of any other type. This new design is equipped with a beater-type agitator, new quiet running motor drive, oil supply tank, non-drip oil inlet, 4-in. outlet flush valve, self-guiding ground seat and other features. Working capacity, 35 gallons per batch; maximum capacity per hour, 105 gallons.

TOMATO COOKER

The Pfaudler Tomato Cooker differs from any other type in that the tank is glass lined and self-draining. It is equipped with a Pfaudler coil which is famous for its efficient heat transfer and patented features which prevent burning-on. Hence, discoloration is minimized, waste eliminated, cleaning cost reduced to a minimum.

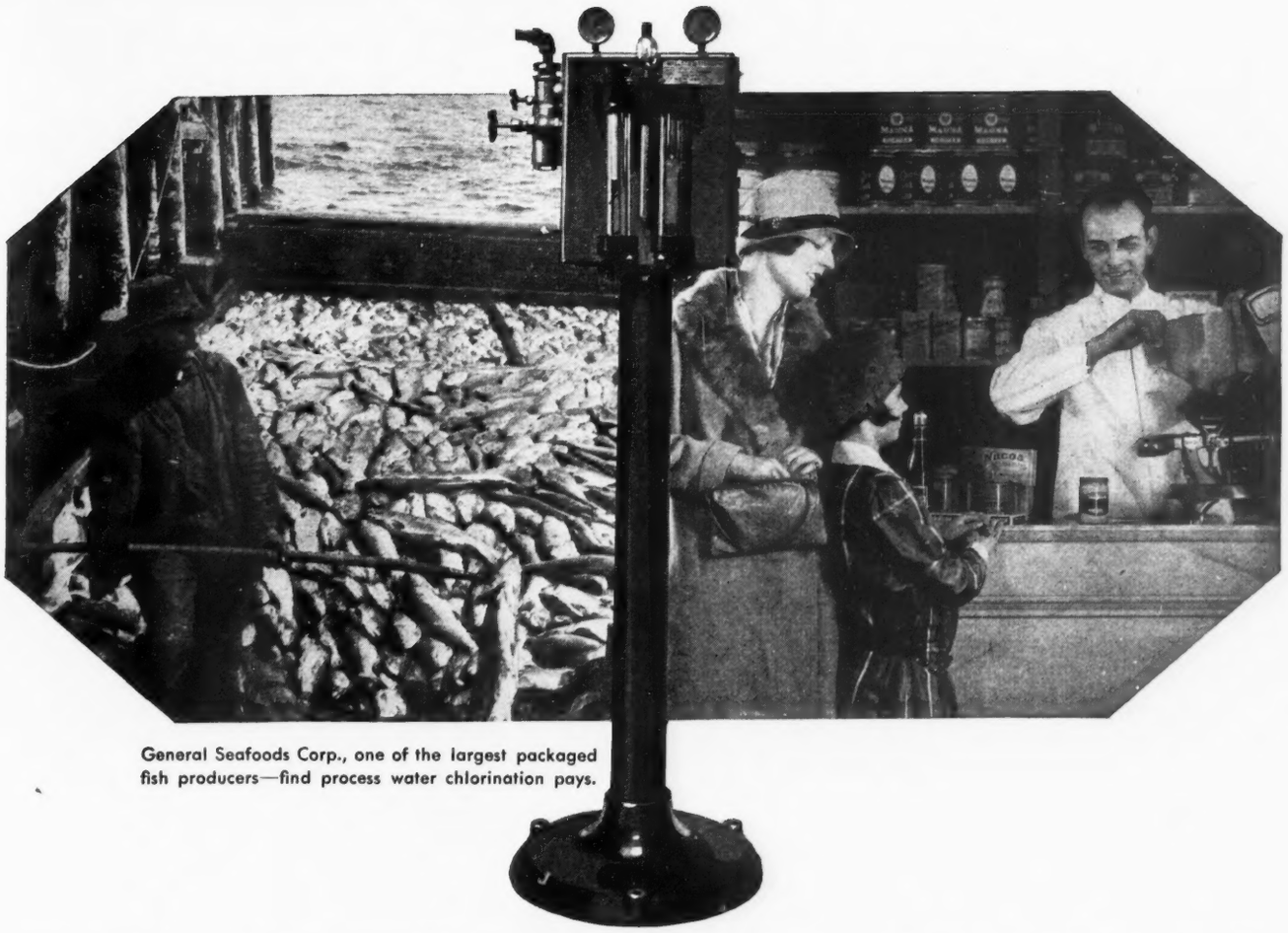
Briefly, this display of machinery constitutes what we believe will be the high-light of the Canning Machinery Exhibit. Don't miss it. If you are not planning to go to Chicago, then by all means send for our new literature.



New Pfaudler Mayonnaise Mixer with Oil Supply Tank attached. The latter is an optional feature. It has six times the hourly capacity of other machines.

THE PFAUDLER CO., 1510 Gas & Elec. Bldg., Rochester, N. Y.

NEW YORK	ELYRIA	CHICAGO	SAN FRANCISCO	LOS ANGELES
8 West 40th St.	Pfaudler-Elyria Div.	1422 Conway Bldg.	122 New Montgomery St.	1855 Industrial St.



General Seafoods Corp., one of the largest packaged fish producers—find process water chlorination pays.

THIS QUESTION OF SPOILAGE

If you are keen to eliminate spoilage look to your process water. Is it contaminated?

If it is, it's a sure source of spoilage. But—it can be chlorinated and 50 cents a million gallons is a small premium to pay for absolutely pure process water.

Throughout the world two hundred million lives are safeguarded from water borne disease because of chlorination. Drinking water in over thirty-five hundred American municipalities is daily sterilized with W & T chlorinators.

Why not give your products and your customers this same protection?

We will gladly tell you how.

WALLACE & TIERNAN CO., INC.

Manufacturers of Chlorine Control Apparatus

NEWARK, N. J.

OFFICES IN PRINCIPAL CITIES

A Product of

WALLACE & TIERNAN

"The only safe water *is a sterilized water"*

I-2

NO KELVINATOR HAS EVER WORN OUT

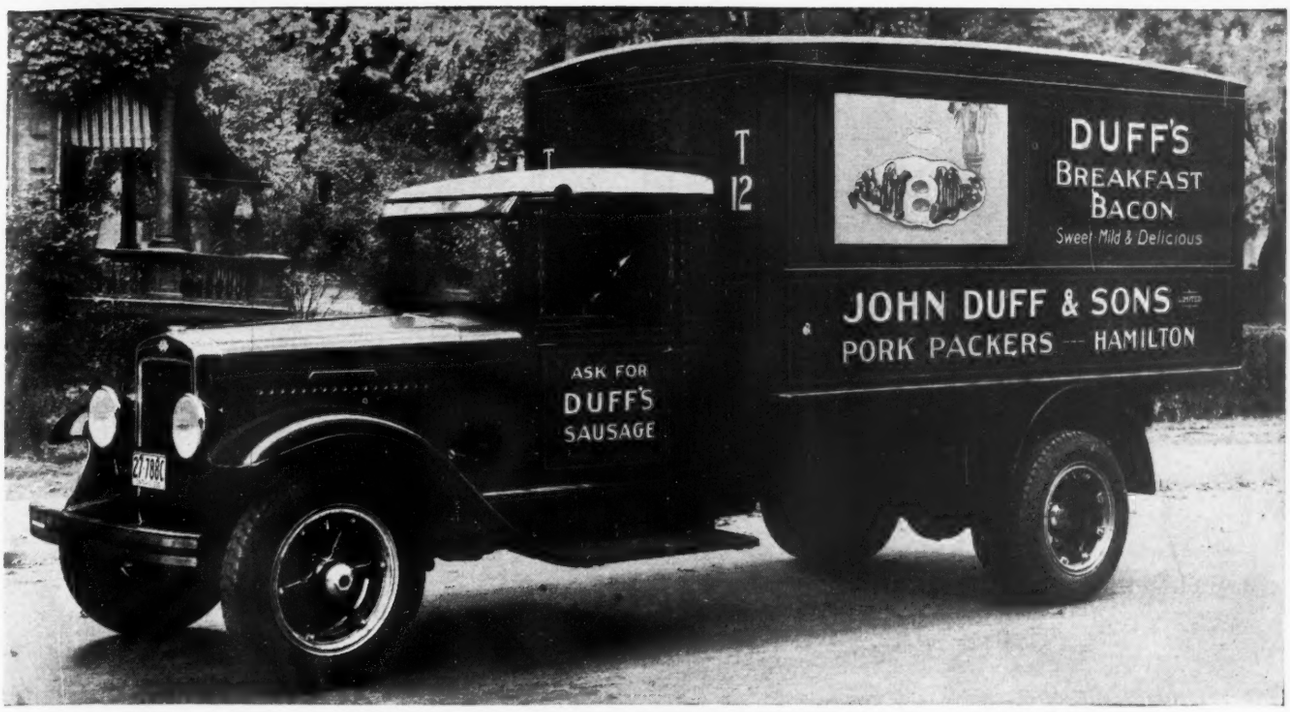
1914 · 1931

THE experience of thousands of grocers, butchers and other food merchants, over a long period of years, has proved the dependability and economy of Kelvinator electric refrigeration equipment. Records fail to disclose any Kelvinator that has ever worn out, or been discarded because of its inability to do the job for which it was intended. Records also show that in many cases, the saving made with Kelvinator equipment during the first year is sufficient *to pay for the equipment.* Every year from then on, this saving is *clear profit.*

KELVINATOR CORPORATION
14271 Plymouth Road, Detroit, Michigan
Kelvinator of Canada, Limited, London, Ontario
Kelvinator Limited, London, England

(180)

Electric Refrigeration for Homes, Offices, Stores, Factories, Etc.



This is a new International Speed Truck, Model A-4, 2-ton capacity, 170-in. wheelbase, with a refrigerator body

A User of INTERNATIONAL Trucks for 20 Years

TWENTY YEARS AGO John Duff & Sons, Ltd., pork packers at Hamilton, Canada, purchased its first International Truck. This firm, which is one of the oldest packers in the province of Ontario, has used Internationals since that time. The above truck, a new International Speed model, is the most recent addition to its fleet.

Any delay in the delivery of meats and foods is costly. Trucks that can be depended on for day-in and day-out performance, no matter what the going, are needed in the packing and food industries. The long experience of John Duff & Sons with Internationals offers sound proof of the performance and dependability of these trucks and of their real worth in the transportation of perishable products.

Today there is a complete new line of International Trucks. They are advancing the reputation Internationals have for turning in the maximum pay loads and pay mileage. They are modern trucks that meet modern hauling conditions.

The best way to get acquainted with the new Internationals is to ask the nearest of 180 Company-owned branches in the United States and Canada for a demonstration. You will see International performance at first hand under all the conditions you want to put it through. You will get a new conception of motor truck values. Write us for information.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. OF AMERICA (*Incorporated*) Chicago, Illinois

SPECIAL DELIVERY:

¾-ton—4 cylinders—3 speeds forward—136" wheelbase—spiral bevel drive—4-wheel brakes.

SIX-SPEED SPECIAL:

1½-ton—4 cylinders—6 speeds forward and 2 reverse—136" wheelbase—spiral bevel drive—4-wheel brakes.

SPEED TRUCKS:

1½-ton—6 cylinders—4 speeds forward—138", 152", 164" wheelbases—spiral bevel drive.

2-ton—6 cylinders—5 speeds forward—145", 156", 170", 185" wheelbases—spiral bevel drive.

3-ton—2 types, Model A-5 (spiral bevel drive) and Model A-6 (double-reduction drive)—6 cylinders—5 speeds forward—140", 156", 170", 190", 210" wheelbases. All have 4-wheel brakes.

HEAVY-DUTY TRUCKS:

Models W-1 and W-3—2½ and 3½-ton—4 cylinders—5 speeds forward and 2 reverse—double-reduction drive—"steer easy" steering gear—4-wheel brakes.

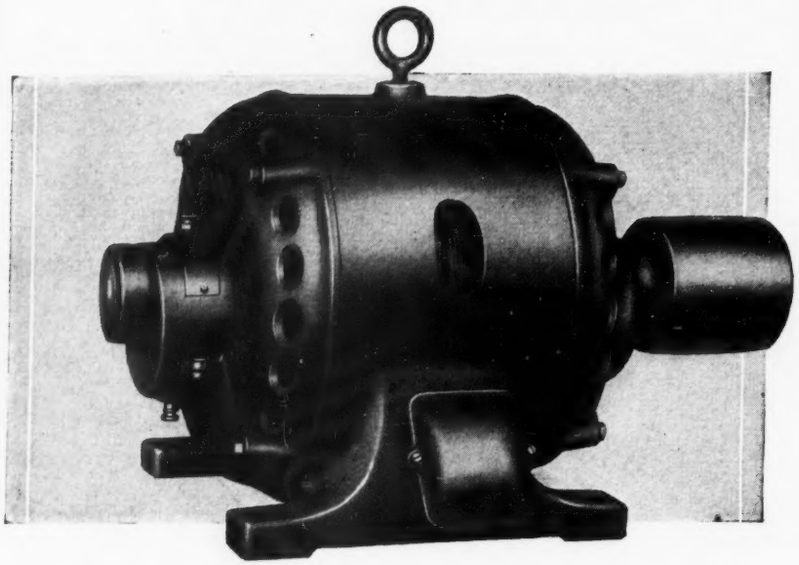
W-1—130", 148", 170", 185", 200" wheelbases.

W-3—144", 160", 185", 210", 235" wheelbases.

INTERNATIONAL

INTERNATIONAL TRUCKS

THEY KEEP A-RUNNING



10 Horse Power Century Type SCN Squirrel Cage Induction 3 and 2 Phase 60 Cycle Motor—Across-the-line-Start.

SIMPLICITY OF STARTING

No current-limiting starting equipment is required on Century Type SCN Squirrel Cage Motors in 30 horse power and smaller sizes, because their starting current is within NELA recommendations . . . Any approved switch or starter may be used. As a result, they take full advantage of the line current—no current is dissipated in starting equipment—installation is simplified and maintenance costs are low.

Century Squirrel Cage motors are built in all standard sizes from ¼ to 250 horse power.

Century 250 Horse Power 60 Cycle 440 Volt 1800 R.P.M. 3-Phase Squirrel Cage Induction Motor.

CENTURY ELECTRIC COMPANY

1806 PINE ST. · · ST. LOUIS, MO.

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

SCN-1-10

FOR MORE THAN 27 YEARS AT ST. LOUIS

Standard Equipment
Camels
A TRAVELING BILLBOARD
ON THE ROADWAY
TO MORE SALES
OVER

Here's a— MILLION DOLLARS that belongs to YOU.

Truck panels ranked first among effective advertising mediums during the war. Progressive firms experimented further. Each test showed greater potential possibilities. Now the experiment is over and national advertisers are buying this moving billboard space wherever it can be purchased. The present rate is a million dollars a year for a city fleet of thirty-four or more trucks. If you are not getting profits from your truck advertising you will do well to rent the space and collect your million. Or better still let Meyercord Truck Transfer Ads bring you this million in increased sales.

DO YOU WANT YOURS IN CASH OR SALES?

ORE ENDURING PALMOLIVE

MEYERCORD WEATHER TESTED TRANSFERS

MAYFLOWER WEATHER TRANSFERS
PALMOLIVE
ORE ENDURING

WHEN • • BUYING CARTONS—

BEECH-NUT BRAND MACARONI
MADE FROM DURUM SEMOLINA
The hardest wheat grown—richest in gluten. Note the amber yellow color and smooth firm texture.
Manufactured by Beech-Nut Packing Co., Canajoharie, N.Y. U.S.A.
DIRECTIONS
Place in boiling salted water (salt about twenty grains or one level teaspoonful to the pint) for one pound package: two pints of water for one half
BEECH-NUT
MACARONI
NET WEIGHT 8 OZ.
OR 226.79 GRAMS
BEECH-NUT
MACARONI

-- *Produced by Sutherland*

Nationally Known
Nationally Used

-- it is wise to place your requirements with package engineers, -- not just package printers. There are so many details to be considered in the sales effectiveness and mechanical perfection of your cartons that it pays to do business with a thoroughly capable source of supply. Sutherland is serving leading food packers of the nation for just this reason.

SUTHERLAND CARTONS

SUTHERLAND PAPER CO. KALAMAZOO, MICHIGAN

Keep thy Shop and [The Sayings of

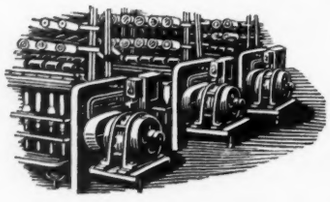
thy Shop will keep thee Poor Richard]

Just Published for 1931

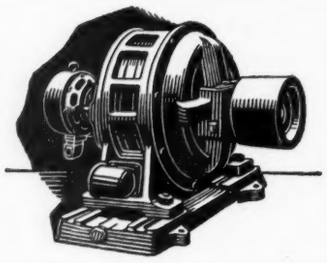
AN

Almanack

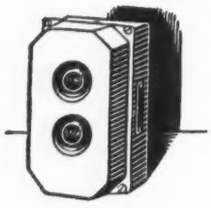
containing wise, thought-provoking suggestions for modernizing industrial plants and published in the firm belief that a penny spent on modernization to-day will be worth ten pennies spent to-morrow.



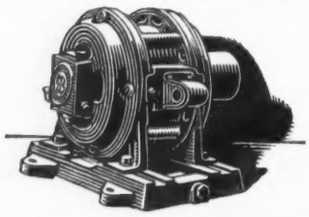
A certain group drive required 164 large bearings and 3600 feet of heavy belting. It was replaced by G-E individual direct-motor drive with 20 small bearings. Maintenance dropped from 65 cents to 12 cents per ton of product.



High power-factor is as beneficial to the plant as to the vendor of electricity. In many cases, the G-E sales engineer can show you how to pay for "leading-power-factor" synchronous motors out of the economies that follow their installation.

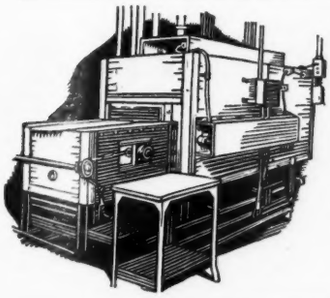


Instead of saying, "I can't use a synchronous motor here because I don't want it to stop at every voltage disturbance," call in the G-E sales engineer and ask him to show you the G-E time-delay devices which keep not only these motors, but all induction motors, on the line for all temporary voltage dips.

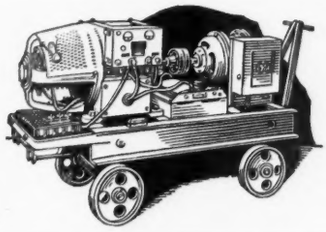


If power conditions in your plant will stand full-voltage starting, there are a number of G-E motors now available for this service that will greatly simplify your control equipment.

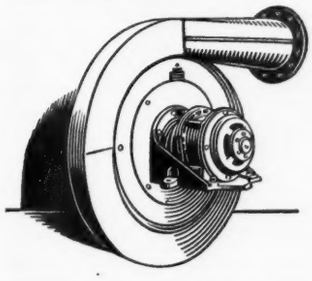
Continued bearing trouble was traced to an uninstructed night man who slapped off the belts by mishandling the starter and kept tightening them up to make them stay on. A G-E magnetic starter would have saved six months of trouble.



A New England manufacturing plant modernized its heat-treating department, at the suggestion of a visiting G-E heating specialist, by replacing four old fuel-fired, batch-type furnaces with a G-E automatic electric conveyor furnace. Handling costs dropped 60 per cent; production was tripled; the products were much improved; and the former high maintenance costs dropped out of the picture.

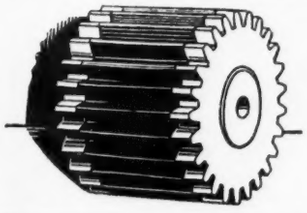


Hundreds of plants are getting "out of the red" and scores of little plants are growing big because they called in the G-E arc-welding specialist to help them modernize their products with arc welding—the greatest of modernization tools. It's almost impossible to strike an arc without improving design or cheating the scrap heap with a neat repair.



No better time to replace those old, inefficient blowers in the forge shop with modern G-E blowers that speed up production by maintaining uniform pressure on each furnace and reduce power costs because they are so efficient. Also, the operation of your cupolas can be greatly improved, and a substantial saving in coke effected, by installing a G-E cupola blower with automatic blast-gate control.

Give your plant engineer some G-E Thyratron or photoelectric tube equipments to play with and you'll be surprised at the number of places where he can use them to speed production, simplify control, and cut costs.



After you've replaced a stripped pinion on a motor shaft a few times, ask the G-E sales engineer to send you a Fabroil or a Textolite pinion. They outlive most other pinions by wide, wide margins. They practically eliminate noise, too.

Modernization Reduces Costs — Increases Profit

There are any number of ways in which the G-E sales engineer can help you to modernize. Ask him about them when he calls; or write the nearest G-E office.

GENERAL ELECTRIC

200-426

In Bakeries Alone **BAD WEATHER** can raise serious trouble in 7 operations

And bakeries are only one example of what Manufactured Weather, by complete control of indoor weather, offers practically every food industry

THERE is probably no better example of the havoc bad weather can work in food industries than a bakery. Let it be too dry, too hot, too cool, or too moist, and the dough won't ferment on schedule. Finished loaves are poor-looking, poor-tasting. More flour, more yeast have to be used. The mix has to be doctored. All along the line bad weather leaves its mark, right through final proofing, cooling and packing.

Bakeries are one case. There are dozens more. Cornflakes, or soluble coffee powders that take on moisture readily. Bulk stored products that ferment, lose crispness or other important qualities when there is too much moisture in the air—or that change their composition and have to be re-processed—or dry out and make processing difficult—when the air is too dry.

There is one way to end the gamble of bad weather in your food processing—Manufactured Weather. This is the Carrier system of air conditioning, scientifically designed and scientifically controlled. Manufactured Weather automatically maintains the condition of temperature, *humidity*, air cleanliness and air motion best suited to your process and your product.

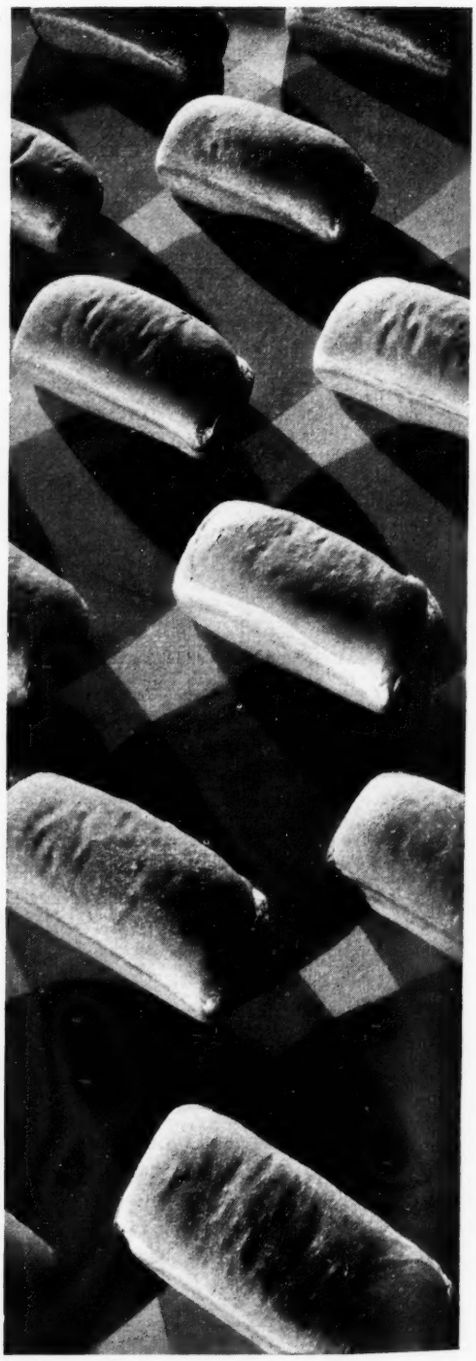
Will you take three minutes to think what complete control of weather conditions would mean to your weather-sensitive proc esses, and then drop a line to our Newark office for the engineering and economic story while the subject is still fresh in your mind?

Carrier Engineering Corporation

A DIVISION OF CARRIER CORPORATION

Home Offices: Newark, New Jersey. Branch Offices: Boston, New York, Philadelphia, Washington, Cleveland, Detroit, Chicago, Dallas, and Los Angeles. *For foreign office* addresses write Newark office.

MANUFACTURED WEATHER ENDS BAD WEATHER



Well over 3,000 systems of Manufactured Weather are now installed in more than 200 kinds of business

● Canning is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product

People motored to a Syracuse cannery for this special brand of beets

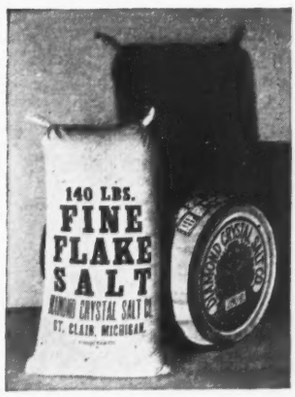
ALMOST under protest, a Syracuse canner began to use Diamond Crystal Salt. "I can see that purer salt will give a better pack," he said, "but will the public ever notice the difference?"

During the next few months there took place nothing unusual, although jobber sales came along nicely, and apparently retailers were reordering. Then one day occurred the first of a series of incidents such as had never before befallen this canner. A dust-covered touring car drew up in front of his cannery, and a well dressed woman stepped out. "Is this the place where these beets were canned?" she asked, holding out a familiar looking can. "Some friends sent me these, and they were so good that when I found I couldn't buy them around where I live, I just had to drive over here for more."

The canner was pleasantly surprised, and from that day began to be more and more impressed with the advantages of using salt free from impurities. Especially when other people, from other parts of the state, began to motor over to his plant and seek out his beans and corn and peas.

Today this canner's sales have sizably increased. He not only sells a bigger bill to local jobbers, but he has found it quite easy to widen his distribution into more distant territories. And he is quite outspoken in saying that Diamond Crystal Salt played an important part in building his success.

Why don't you too take advantage of the numerous benefits offered by Diamond Crystal Salt? There is no other salt like it, for no other salt is made by the exclusive Alberger process. No other salt offers the same freedom from impurities that harden the water, and thereby harden the vegetables. This purest salt develops appetizing flavor. It preserves nature's temptingly bright colors. Always uniform in purity, it is composed of tiny flat flakes, and is made by the Diamond Crystal Salt Company, (Inc.). Bulk Department, 250 Park Avenue, New York, N. Y.

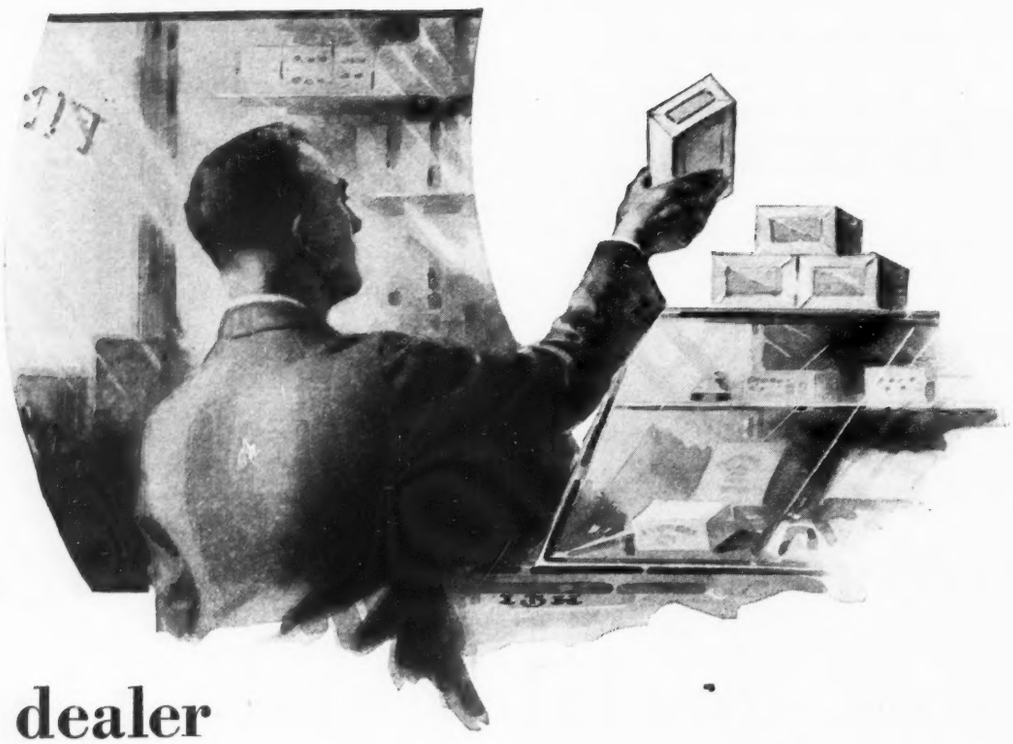


Year in, year out, since 1886, Diamond Crystal Salt has averaged 99.9% pure—or better

DIAMOND CRYSTAL SALT

A PRODUCT OF GENERAL FOODS CORPORATION

© 1931, G. F. Corp.



The dealer picks his cast for that daily drama . . "Display makes Sales"

IN every retail store there are certain high spots for display. A few shelves have the best chance for attention from the customer's eye—one counter case is more desirable than another—merchandise will move quickly in a particular part of the store and slowly in another.

The wide-awake dealer is careful to use these natural points of display to the best advantage. The result is that only the *more attractive looking items, with real sales appeal,* get these choice locations.

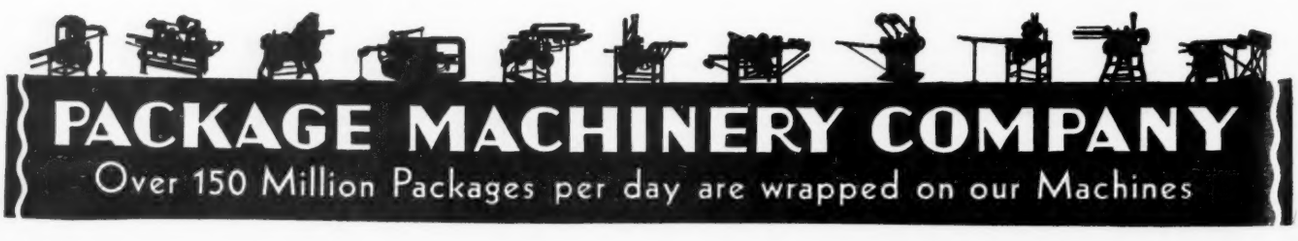
Where does your product rate with the dealer? Is it so attractive that he gives it the spotlight regularly, or is he likely to shunt it to the back of the shelves with the "just-so-so" looking packages?

You need *new* customers to increase sales volume. And there is no more effective way of winning new buyers than *effectively packaged goods effectively displayed at the point of sale.*

Package Improvements

Bring your packaging problem to us. We have satisfied the big package goods concerns for over a quarter of a century. If you seek improvements in appearance, a new way to wrap your product, or lower production costs—consult us. It is important for you to get a good part when the dealer picks his cast for merchandise display.

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts
New York Chicago Los Angeles
London: Baker Perkins, Ltd.



YORK'S *second message* ... tells about your contribution to Food-and-Good-Living

Chicago gave a

Thanksgiving Banquet... *in September!*

... and the world suddenly realized that a new era in food-and-good-living was here

ON SEPTEMBER 23rd, 1913, Chicago newspapers headlined a brand new wonder-of-the-age ... a Thanksgiving feast two months before Fall Harvest Week!

In the Sherman House Casino, one thousand delegates to the International Congress of Refrigeration seated themselves to an unprecedented banquet. Oregon sent June-caught caviar. Tennessee supplied January-killed turkeys, Kansas December pullets. Troy, Pennsylvania churned the butter, while the cranberries came from Wisconsin's crop of the year before!

It was the first public function where a whole continent contributed an entirely out-of-season menu ... and served it in height-of-season perfection. A menu of refrigerated foods.

Before 1900, your typical American breakfast was prunes or applesauce, oatmeal, fried hominy and ham. Your fresh food was limited to what a local farmer could raise in season and haul to market. The rest was dried, salted or pickled.

Today, you unconcernedly decide between Florida oranges, California grapefruit, or Argentine melon. You enjoy April eggs in January. California sends you lettuce across the Arizona desert. Texas grows most of your spinach and Michigan your celery. Each state can feast on Vermont turkey and Kansas beef every day in the year.

Originally, the North celebrated Thanksgiving day in November because that was its season of plenty. Today, 200,000 refrigerator cars carry each section's season of plenty to every section. Height-of-season flavor literally "keeps" for you in gigantic refrigerated storehouses, in refrigerated retail shops. Even South America's summer is sent in refrigerated ships to freshen our North American winter.

Thus, in a very direct way, Refrigeration explains this new era in food-and-good-living. It explains how such millions can subsist in New York, Chicago and other populous centers ... how they can enjoy all year round the health-giving vitamins in fresh food, the variety of the whole world's harvests.

York engineers pioneered refrigeration 50 years ago. They assisted in its development on railroads, in ships, in food storehouses, shops, and in 202 industrial applications.

Marvelous as these world-changing accomplishments of refrigeration have been ... they are but a hint of what the future of refrigeration holds.

YORK ICE MACHINERY CORPORATION, YORK, PENNSYLVANIA

INDUSTRIAL REFRIGERATION DIVISION
Refrigeration specifically applied to every industrial need.

ICE PLANT DIVISION
Ice making machinery and ice plant equipment ... a complete service to the ice industry.

AIR CONDITIONING DIVISION
Complete air conditioning systems for maintaining proper atmospheric conditions for comfort and industrial purposes.

ICE CREAM AND MILK PLANT DIVISION
Refrigerating machinery and specialized equipment for ice cream making, dairies and milk products.

COMMERCIAL UNIT DIVISION
Self-contained refrigerating units for meat markets, groceries, delicatessens, florists, restaurants, hotels, hospitals

MARINE DIVISION
Equipment and engineering for all marine refrigerating requirements.

ACCESSORY AND SUPPLY DIVISION
Refrigerating lubricants, supplies, fittings, accessories.

EXPORT DIVISION
Adapts to varying needs of export markets, products and services of the other divisions. General Export Office, New York. Cable: Shiplevma, N. Y.

SERVICE AND MAINTENANCE DIVISION
Engineering service obtainable from 71 direct factory branches in the U. S. A. and 20 foreign cities.

YORK
REFRIGERATION

● Reproduced here is the second full-page Saturday Evening Post advertisement in the York Ice Machinery Corporation's national advertising campaign which is telling America about Mechanical Refrigeration.

This advertisement describes how you ... the producers and distributors of the nation's food supply ... have created a new era of food-and-good-living ... through the use of Mechanical Refrigeration. This message will draw a clearer picture in the minds of the public of the importance of your industries in their daily lives.

York is publishing this story because, since its beginning, York has been identified with you.

Your refrigerating problems have been York's problems. In solving them, York has worked side by side with you ... studying your needs, designing and furnishing refrigerating equipment and engineering installations to fit these needs. As your methods improved, York kept pace ... developing new and better equipment ... assuring you more efficient and more profitable operation.

York service to the food producing and distributing industries is a complete service. You are invited to make profitable use of it by communicating with the nearest of York's direct factory branches located in 71 cities throughout the United States.

YORK ICE MACHINERY CORPORATION
» » YORK » PENNSYLVANIA « «

CANCO packages are distinctly for the manufacturer of today who knows the value of a package keyed to buying tastes—a package exactly suited in appearance and style to the market to which his product is sold. Their design and manufacture call for qualities the American Can Company is unusually suited to provide—by reason of its experience and position, intimate market knowledge, its wealth of skilled personnel and equipment. All await you here—all to contribute their part in building a package ideally suited to product and market.

AMERICAN CAN COMPANY CANCO

Chicago
104 So. Michigan Ave.

New York
New York Central Bldg.

San Francisco
111 Sutter Street

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....A McGraw-Hill Publication—Established 1928.....Number 1

NEW YORK, JANUARY, 1931

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Laurence V. Burton, Editor

Who Will Make the Profits in 1931?

THE YEAR just closed has been moderately prosperous for the food industries as a whole, although it has held an unusual amount of troubles. For many of the more efficient units it has been a year of normal profits, but a struggle has been required for some of the others to hold their own. Yet with all its difficulties it was a year of definite technical progress, for development is a child of necessity. If good earnings were always certain the big incentive to dare and do the new would be lacking. Unbroken prosperity might easily halt all advances.

THE FOOD INDUSTRIES have continued during the past year to occupy first position in the order of value of products manufactured. In the matter of retail sales, however, the first national distribution census discloses that in some communities expenditures at retail for food are less than those for automotive products and the materials used in motor-car operation. This fact apparently is but another evidence that men can eat only so much food, whether it be measured in pounds, in bulk, or in calories. Possibly the food industry is ultimately destined to take a lower position measured by the total retail value, in comparison with the retail value of other goods and services.

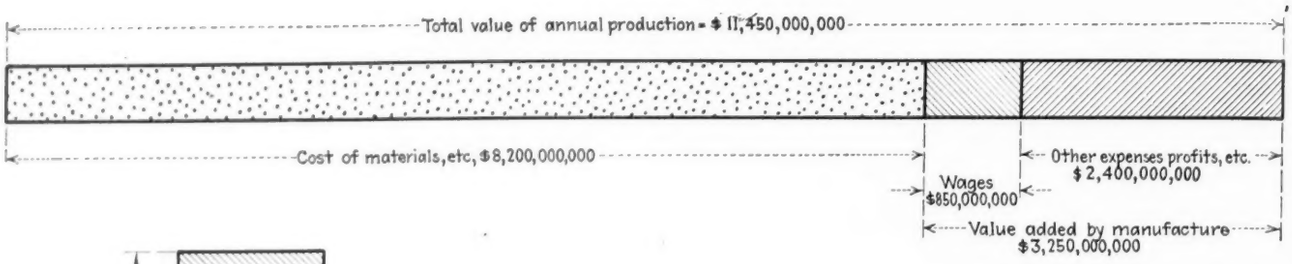
ABOVE ALL OTHER TRENDS stands out the tendency to integrate, to consolidate, and to merge. This probably is more than a mere reflection of the investment banker's activities. It seems to represent a very real effort at improvement of the economic prospect for food manufacture. But it is too early, by at least a year, to evaluate the economic consequences of the trend.

THE RECORD of 1930, unfortunately, is not yet complete. Many facts will not be disclosed until the census figures become available, and the last census-taking was for 1929. In the succeeding pages have been gathered those data which indicate the outstanding trends as far as these can be shown by statistics. In addition, technical trends and developments are summarized. Manufacturers, however, are concerned with the record of the past only as it points the way for the future. And when this direction or future trend is known, it can be followed only by those who have the ability to make the changes required.

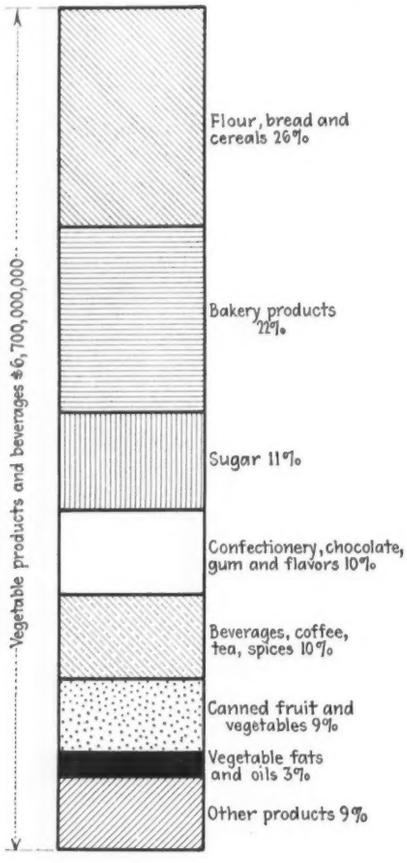
THUS the mechanism of constant readjustment is as important as the direction which the adjustment is to take. Without it no forward movement can be made. Never in the life of a business is research so important as during a depression. As a conscious method of getting out, and keeping out, of difficulties, it demands close study.

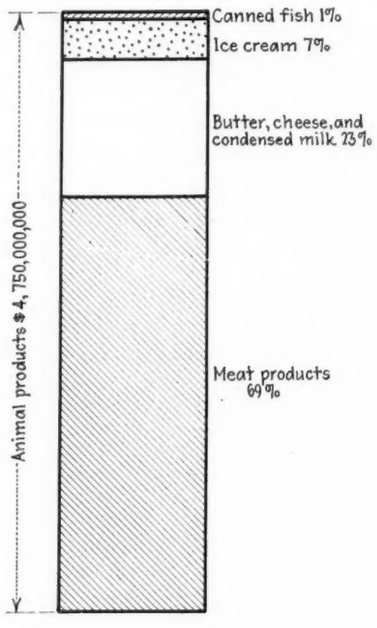
BECAUSE the times have thus enhanced the importance of research, "Food Industries" presents, in addition to the review, an explanation of what research is and how to use it. Men who have demonstrated how increased profits can come from it freely offer their knowledge in these pages.

The Value of Manufactured Foods


Total value of annual production = $ 11,450,000,000
Cost of materials, etc, $8,200,000,000
Wages $850,000,000
Other expenses profits, etc. $ 2,400,000,000
Value added by manufacture $3,250,000,000

Figures made available since this chart was drawn show a total value of annual production of $11,750,000,000.


Vegetable products and beverages $6,700,000,000
Flour, bread and cereals 26%
Bakery products 11%
Sugar 11%
Confectionery, chocolate, gum and flavors 10%
Beverages, coffee, tea, spices 10%
Canned fruit and vegetables 9%
Vegetable fats and oils 3%
Other products 9%



THE FIGURES in the charts and table represent processed foods only and do not include an approximately equal value consumed without processing. The raw foods not shown include such large items as market milk, fresh fruit and vegetables, and fresh fish. The figures for the manufactured foods show at a glance the relative standing of each branch of food processing and the relation of the whole to the total of American manufacture, of which it constitutes about one-sixth.

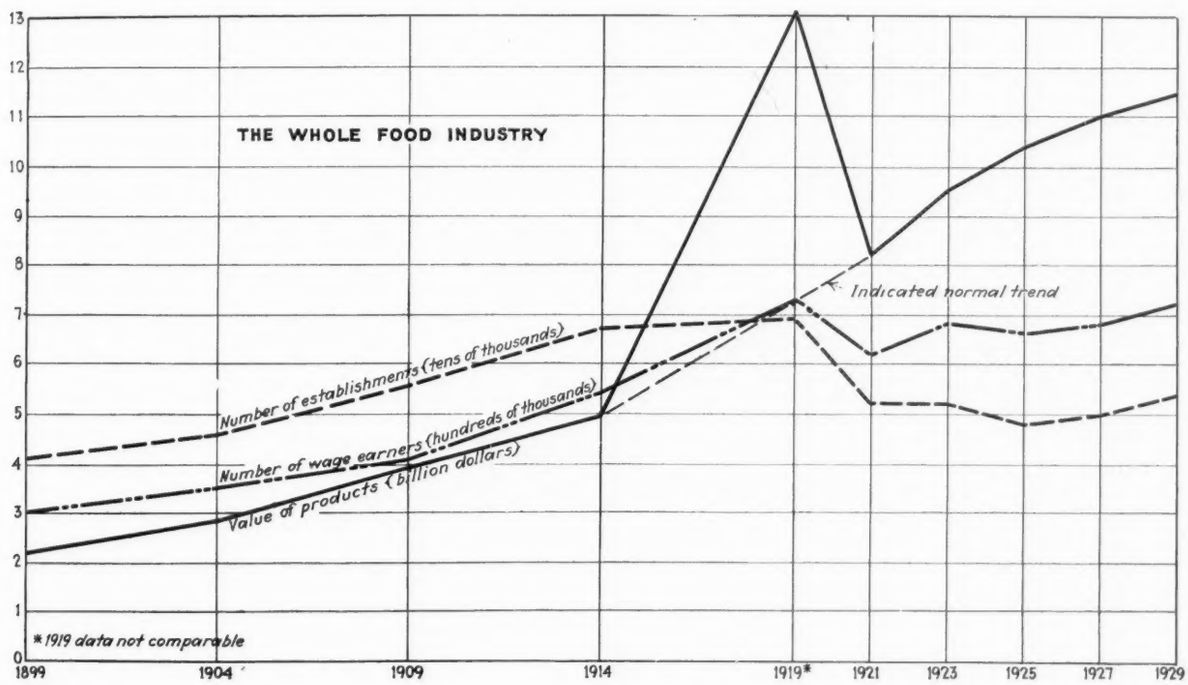
The values used here are preliminary estimates for the past year. As the Bureau of Census has not yet completed its compilation, official figures cannot be given. Those used, however, are estimates based on sufficiently extensive data to insure their close approach to the values that will be officially announced at some later date.

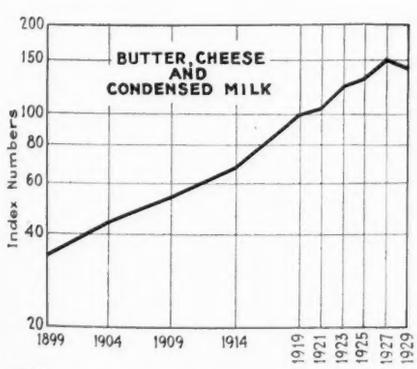
Relation of Food Processing to All Manufacturing

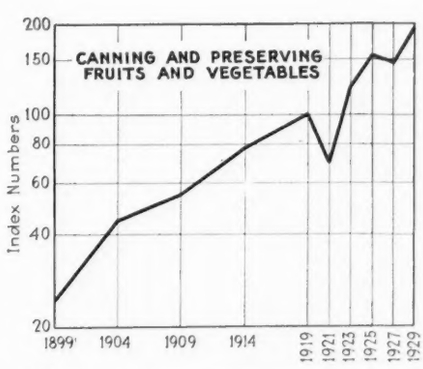
	All Manufacturing Industry	Food Industry	Ratio, Food to All
Number of establishm'ts	199,000	54,000	27%
Number of wage earners	8,550,000	720,000	8½%
Value of products	$68,450,000,000	$11,450,000,000	16%
Average number of wage earners per establ'mt	42	13	....
Average output per establishment	$342,000	$212,000	....
Average output per wage earner	$8,000	$16,000	....
Average annual wage (Much is seasonal in food industry)	$1,320	$1,180	....

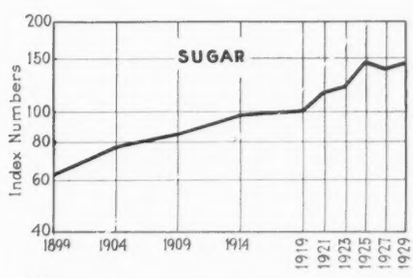
Growth Trends In Food Manufacture

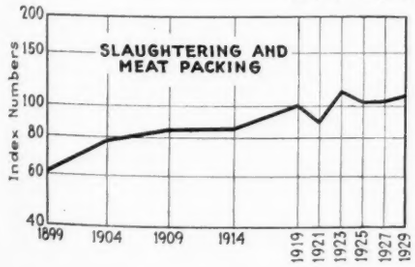
NOT only have the food industries shown a normal trend upward, as the curves on this page indicate, but with a continually increasing population a similar growth promises for the future. The curve for number of establishments, when compared with the growth in production value and wage earners, shows the effect of the trend toward mergers and larger producing units. The curves for individual branches of food manufacture indicate the variations in growth for different products. The curves on this page are made up from data in Monograph VIII, Bureau of the Census, with data for years since 1923 added from other Census publications.

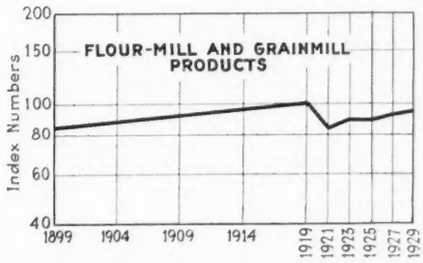


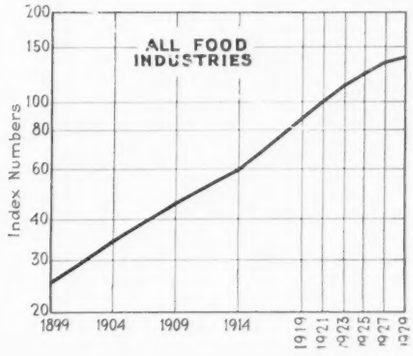












What the Census Tells

A summary of data from the 1929 Census of Manufactures

Industry	Number of Establishments		Number of Wage Earners*		Wages†		Cost of Materials‡	
	1929	Per Cent Increase Over 1927	1929	Per Cent Increase Over 1927	1929	Per Cent Increase Over 1927	1929	Per Cent Increase Over 1927
Beverages	5,047	5.8	27,946	3.6	$37,998,134	5.3	$101,651,576	(*a*)
Bakery Products	20,482	13.0	197,859	15.0	272,041,277	15.2	725,112,309	4.6
Canned Fruits and Vegetables	2,882	18.3	97,261	20.2	69,036,503	10.8	457,124,143	28.7
Cereal Preparations (Breakfast foods, prepared flour and cereal coffee substitutes)	97	(*d*) 20.	5,973	— 0.9	8,178,357	— 2.8	79,707,841	—13.1
Chewing Gum	39	(*d*) — 1.	2,327	— 7.8	2,799,615	2.7	23,877,637	—12.1
Chocolate and Cocoa Products	58	(*d*) —11.	6,259	— 2.6	7,879,195	7.4	80,673,234	—10.8
Coffee and Spice	937	19.5	8,680	5.9	10,669,312	11.9	293,893,128	3.2
Confectionery	1,925	0.9	62,633	— 0.8	55,646,006	— 2.3	213,009,107	(*a*)
Corn Products	34	(*d*) 8.	6,733	— 3.4	9,872,489	— 5.9	104,276,348	14.7
Creamery Products:								
Butter	3,409	— 3.1	17,805	—11.4	22,479,187	—12.0	595,965,977	(*a*)
Cheese	2,699	— 1.4	3,328	— 5.5	4,417,703	— 9.8	94,859,437	(*a*)
Condensed and Evaporated Milk	520	12.1	6,992	— 5.4	8,690,186	— 5.4	162,567,086	(*a*)
Fish, Canned and Preserved	(*cc*) 337	.....	(*cc*) 12,650	.....	(*cc*) 8,105,581	.....	(*cc*) 42,891,556	.....
Feeds, Prepared for Animals and Fowls	738	65.1	10,469	37.2	13,179,275	35.8	338,281,239	(*a*)
Flavoring Extracts and Flavoring Syrups	567	13.4	4,685	— 6.5	6,432,612	— 9.8	50,882,864	— 0.4
Flour and Other Grain Mill Products	3,873	— 4.0	26,453	—11.8	34,652,336	— 7.7	851,699,822	(*a*)
Ice Cream	3,071	3.7	21,534	— 1.8	32,530,597	— 1.7	148,370,444	— 1.5
Macaroni, Spaghetti, etc	377	6.7	5,250	14.5	5,634,094	11.1	28,012,214	2.1
Malt	25	(*d*) 2.	569	13.8	1,226,175	35.6	18,300,939	6.5
Manufactured Ice	3,834	21.4	30,511	37.9	39,922,187	22.4	42,452,968	(*a*)
Meat Packing (*u*)	1,244	— 0.5	121,246	1.8	164,487,568	1.8	2,938,028,285	(*a*)
Oleomargarine and Other Butter Substitutes	35	(*d*) — 1.	1,369	— 8.9	2,050,145	— 9.2	27,470,939	(*a*)
Peanuts and Other Processed Nuts	169	17.4	7,868	6.7	2,923,806	—11.1	40,305,256	—12.2
Poultry Killing, Dressing and Packing	420	(*aa*)	6,807	(*aa*)	6,389,792	(*aa*)	93,805,351	(*aa*)
Rice Cleaning and Polishing	58	(*d*) — 2.	1,569	3.0	1,425,299	— 7.8	38,099,671	—18.0
Sausage and Sausage Casings	672	33.1	5,833	17.4	8,760,167	17.4	80,590,402	33.8
Sugar:								
Beet	82	(*d*) 3.	7,530	1.7	9,989,855	2.9	71,948,440	— 8.9
Cane	68	(*d*) —26.	1,977	(*n*) — 4.3	1,401,050	(*n*) — 0.7	11,220,851	(*n*) — 3.2
Cane-Refining	21	(*d*) 0.	13,920	— 0.5	17,850,493	0.8	438,664,095	—20.5
Vegetable Cooking Oils and Lard Substitutes	38	(*d*) 5.	2,462	— 7.3	2,627,929	0.1	131,935,892	(*a*)
Vinegar and Cider	(*cc*) 158	.....	(*cc*) 1,123	.....	(*cc*) 1,235,996	.....	(*cc*) 5,858,241	.....
Foods not Otherwise Specified (*bb*)	846	25.5	10,271	— 0.2	11,273,405	— 1.0	85,819,313	(*a*)
Total (△)	54,762	10.0	737,892	8.6	$919,804,000	11.7	$8,417,353,000	3.7

* This is the average for the year. It does not include salaried employees. The average number of wage earners is based on the numbers reported for the several months of the year.

† Manufacturers' profits cannot be calculated from census reports because no data are collected for certain expense items, such as interest on investment, rent, depreciation, taxes, insurance and advertising.

‡ Includes cost of materials, containers for products, fuel, and purchased electric current.

of FOOD PRODUCTION

Note.—As the purpose of this preliminary report is to make the census statistics available at the earliest possible date, thus insuring their maximum current value, they have been compiled from returns which have not received the careful revision which will be given them before the final reports are issued. For this reason, some of the items may differ appreciably from the corresponding items in the final reports, but it is believed that these differences are not of sufficient importance to affect their value for practical purposes.

Industry	Total Value of Products		Value Added by Manufacture		Cost to Value ¶ Ratio (per cent)	
	1929	Per Cent Increase Over 1927	1929	Per Cent Increase Over 1927	1927	1929
Beverages	(*b*) $267,111,881	10.1	$165,460,305	(*a*)	39.3	38.0
Bakery Products	(*c*) 1,510,265,011	8.3	785,152,702	11.9	49.8	48.0
Canned Fruits and Vegetables	742,448,106	29.7	285,323,966	31.4	62.0	61.6
Cereal Preparations	147,646,081	— 5.1	67,938,240	6.5	59.0	54.0
Chewing Gum	60,977,676	— 1.7	37,100,039	6.5	43.8	39.2
Chocolate and Cocoa Products	(*e*) 120,761,245	— 1.6	40,088,011	24.1	73.8	67.0
Coffee and Spice	(*f*) 404,535,275	5.3	110,642,147	11.1	74.0	72.7
Confectionery	388,708,398	— 0.8	175,669,291	(*a*)	55.8	54.8
Corn Products	165,989,190	(*g*) 23.4	61,712,842	(*h*) 41.7	67.6	62.8
Creamery Products:						
Butter	(*i*) 700,867,648	— 5.2	104,902,071	(*a*)	86.3	85.2
Cheese	112,633,303	— 4.9	17,773,866	(*a*)	85.0	84.2
Condensed and Evaporated Milk	(*j*) 207,494,284	3.7	44,927,198	(*a*)	79.8	78.4
Fish, Canned and Preserved	(*dd*) 80,000,000	(*dd*) 23.1	(*cc*) 22,190,631	.....	.....	.....
Feeds, Prepared for Animals and Fowls	415,238,214	38.5	76,956,975	(*a*)	81.7	81.5
Flavoring Extracts and Flavoring Syrups	(*k*) 117,395,640	9.5	66,512,776	18.5	47.7	43.3
Flour and Other Grain Mill Products	(*l*) 1,034,525,654	— 9.9	182,825,832	(*a*)	84.8	82.4
Ice Cream	310,537,691	2.9	162,167,247	7.4	50.0	47.8
Macaroni, Spaghetti, etc	(*m*) 48,903,095	7.8	20,890,881	16.5	60.5	57.3
Malt	22,886,762	12.9	4,585,823	48.5	84.8	80.0
Manufactured Ice	201,991,545	9.3	159,538,577	(*a*)	76.3	70.6
Meat Packing	(*v*) 3,394,672,995	11.0	456,644,710	(*a*)	87.3	86.5
Oleomargarine and Other Butter Substitutes	(*p*) 41,028,210	4.4	13,557,271	(*a*)	69.0	67.0
Peanuts and Other Processed Nuts	49,892,635	—10.8	9,587,379	— 4.7	82.2	80.9
Poultry Killing, Dressing and Packing	(*s*) 114,026,755	(*aa*)	20,221,404	(*aa*)	(*aa*)	82.2
Rice Cleaning and Polishing	48,370,258	(*a*)	10,270,587	(*a*)	85.8	78.8
Sausage and Sausage Casings	(*q*) 107,141,155	31.4	26,550,753	24.5	73.8	75.2
Sugar:						
Beet	108,349,385	3.3	36,400,945	40.5	75.3	66.4
Cane	16,227,244	(*n*) 20.8	5,006,393	(*n*) 170.8	(*n*) 86.2	69.1
Cane-Refining	(*r*) 507,389,262	—15.1	68,725,167	49.9	92.3	86.5
Vegetable Cooking Oils and Lard Substitutes	(*t*) 146,127,149	— 1.6	14,191,257	(*a*)	92.4	90.1
Vinegar and Cider	(*cc*) 10,755,246	.....	(*cc*) 4,897,005	.....	.....	.....
Foods not Otherwise Specified (*bb*)	158,056,500	— 5.3	72,237,187	(*a*)	58.8	54.4
Total	$11,762,952,000	6.8	$3,330,649,000	14.8	71.2	67.7

Notes

(*a*) 1927 figures not comparable

(*b*) Divided as follows:
- Beverages:
  - Carbonated $203,619,256
  - Cereal 44,671,981
  - Still 5,588,743
- Grape Juice 5,188,594
- Other Products 10,143,307

(*c*) Divided as follows:
- Bread, Rolls, etc $756,059,507
- Crackers, Biscuits, etc 267,768,150
- Soft Cake 231,498,656
- Doughnuts crullers, etc 39,304,893
- Pies 73,227,595
- Miscellaneous 12,710,160

(*d*) Numerical increase (or decrease)—Percentage not computed when base is less than 100

(*e*) Divided as follows:
- Chocolate (except coatings) $47,277,868
- Chocolate coatings 49,864,589
- Cocoa, powdered 15,106,587
- Cocoa butter 5,452,230
- Other Chocolate and Cocoa Products 1,731,131
- Other Products 1,328,840

(*f*) Divided as follows:
- Coffee (ground and roasted) $368,585,012
- Spices (ground) 19,822,451
- Other Products 16,127,812

(*g*) Per Cent Change from 1919 = —10.9

(*h*) Per Cent Change from 1919 = 10.3

(*i*) Divided as follows:
- Creamery butter *$663,664,754
- Whey butter *460,299
- Butter Oil *310,524
- Other Products 49,037,467

*Made in butter industry; in others as secondary products 12,585 396

(*j*) Includes:
- Condensed Milk $39,371,543
- Evaporated Milk 125,737,077
- Powdered Milk 15,047,740

(*k*) Divided as Follows:
- Flavoring Extracts $32,082,343
- Flavoring Syrups 47,291,535
- Malt Syrups and Extracts 32,281,864
- Concentrates 4,400,850
- Crushed Fruits 4,956,706
- Colors 2,118,935
- Related Products 3,742,395
- Other Products 10,521,012

(*l*) Includes:
- Wheat Flour $720,191,184
- Rye Flour 9,178,649
- Corn Flour 3,120,580
- Corn meal 49,737,778
- Bran and Middlings 138,873,643

(*m*) Divided as Follows:
- Macaroni and Spaghetti $40,307,919
- Noodles, egg 7,374,291
- Raviola 249,198
- Other Products 971,687

(*n*) Compared to 1925.

(*p*) Made in:
- Oleomargarine Industry $30,113,829
- Meat-Packing Industry 16,521,785
- Others (as secondary products) 4,943,050

(*q*) Does not Include Those made in Meat-Packing Industry.

(*r*) Divided as Follows:
- Refined Sugar, Hard $473,346,370
- Refined Sugar (soft and brown) 29,057,634
- Refiners' Syrup Edible 919,802
- Refiners' Blackstrap and Non-Edible 3,044,428
- Miscellaneous Sugar Products 830,085
- Other Products 190,942

(*s*) Includes Canned Poultry $3,242,776

(*t*) Divided as Follows:
- Lard Substitutes and Cooking Fats $97,163,744
- Veg. Cooking Oils 38,824,168
- Other Products 10,139,237

(*u*) Does not Include Total for "Sausage and Sausage Casings" Shown Above

(*v*) Divided as Follows:
- Fresh Meats $1,780,168,651
- Cured Meats 739,756,058
- Canned Goods 45,273,927
- Sausage and Casing ..... (*u*) $220,898,928
- Lard 246,065,758

(*aa*) Not canvassed in 1927

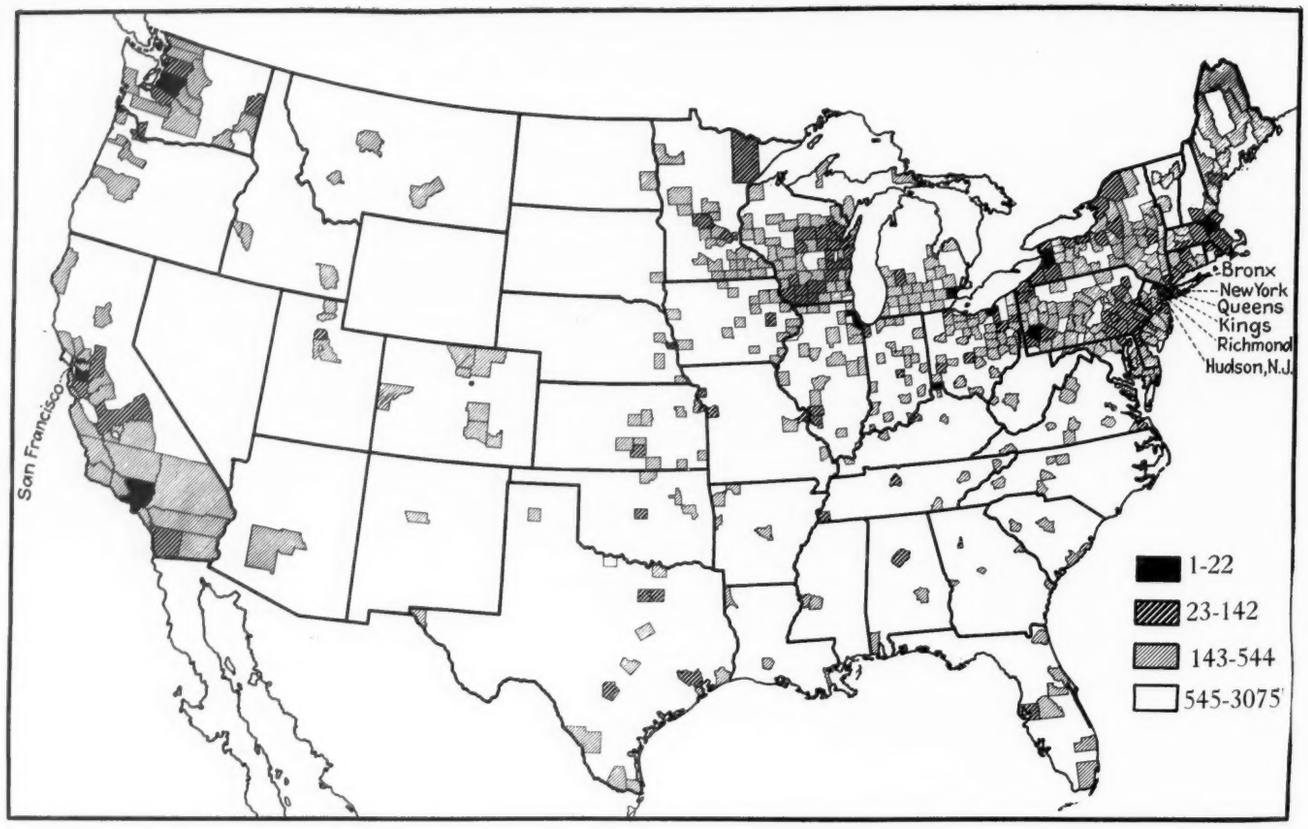
(*cc*) Report for 1929 not yet available; figures given are for 1927

(*dd*) Partially estimated by *Food Industries*

§ Value of products less cost of materials, fuel, and purchased electric current.

¶ Ratio of cost of raw materials (‡) to total value of production. Computed either by the Census Bureau or from Census Bureau statistics; some are not exactly comparable because of changes in cost of materials items.

△ Figures in dollars are given to nearest thousand. Note that percentage increases for cost of materials [*See* (*a*)] and value added by manufacture are only approximate.



Where Food Is Manufactured

IF THE TOTAL NUMBER of food-processing establishments in the United States be divided into quarters, it will be found that one-fourth of the plants are located in the 22 counties having the heaviest concentration, one-fourth in the next 120 counties, one-fourth in the next 402 counties, and the final quarter scattered through 2,129 of the remaining 2,531 counties. On the map the areas of heaviest concentration are black, and as the concentration decreases, the shading is lightened.

Counties Which Include Greatest Number of Plants

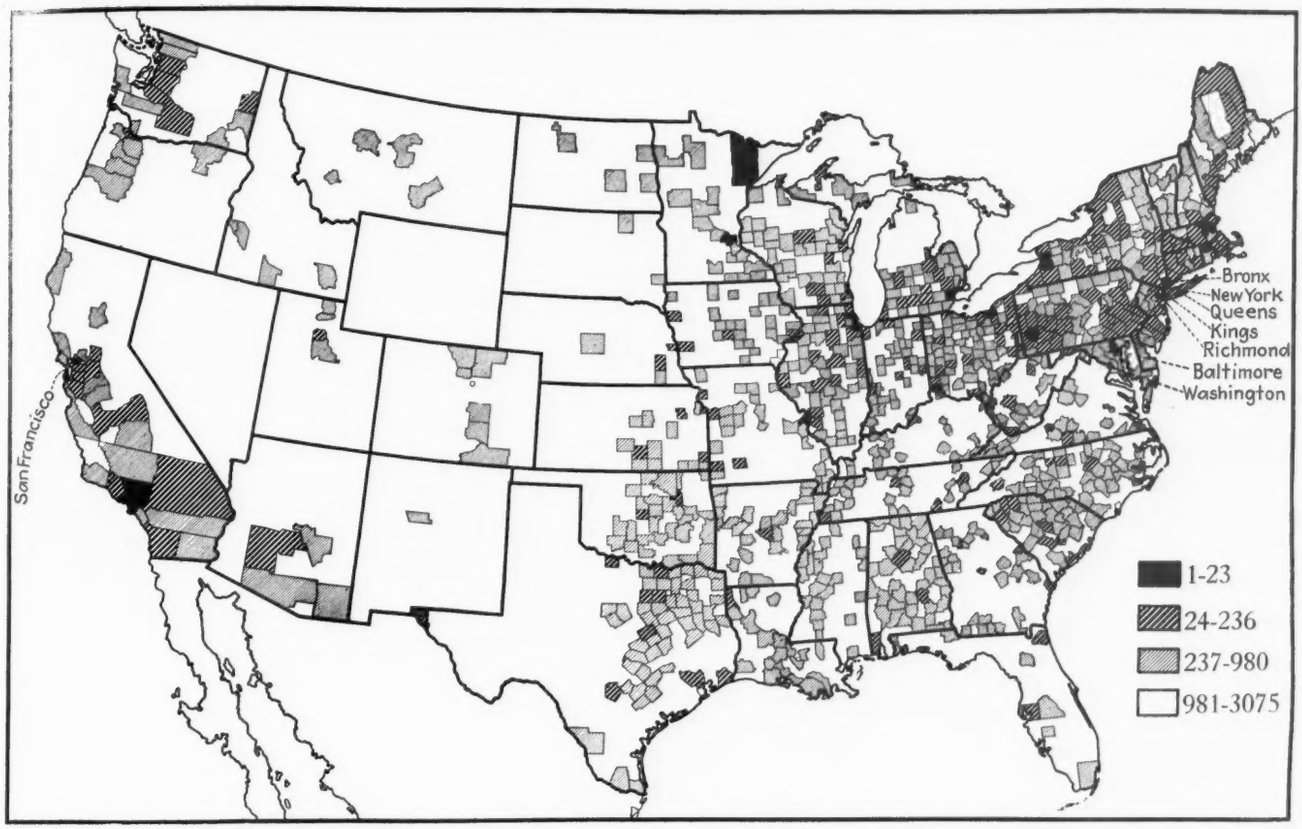
County	State	No. of Food Establishments	Rank
Cook	Illinois	2,131	1
Philadelphia	Pennsylvania	979	2
New York	New York	889	3
Kings	New York	876	4
Los Angeles	California	737	5
St. Louis City	Missouri	668	6
Milwaukee	Wisconsin	584	7
Allegheny	Pennsylvania	544	8
Baltimore City	Maryland	522	9
Suffolk	Massachusetts	499	10
Cuyahoga	Ohio	449	11
San Francisco Co.	California	454	12
Erie	New York	400	13
Middlesex	Massachusetts	396	14
Queens	New York	354	15
Essex	New Jersey	320	16
Bronx	New York	318	17
Hamilton	Ohio	316	18
King	Washington	314	19
Wayne	Michigan	314	20
Hudson	New Jersey	297	21
Alameda	California	269	22
Total		12,650	

FOOD manufacturing is, therefore, evidently concentrated in a few important centers, shown by black spots on the map. To do business with the food industries, one is not compelled to visit every one of the 3,075 counties in the United States. About 13 per cent of the total, or 402, counties contain three-fourths of the industry. Analysis of these facts will enable those dealing with the food field to determine a logical market grouping.

On the opposite page will be found similar details for the concentration of population by counties. Broadly speaking, population is a measure of food consumption, for, at least in the staples, numbers will govern. Hence the population - concentration map enables the food producer to logically plan his distribution campaign.

Comparison of the two maps shows how remarkably close is the alignment between food manufacturing and consumption. Although this is not generally the result of planning, it simplifies the distribution of foods.

It is not feasible to give, on these two pages, all the data needed by the food industries for such purposes. However, by going to the source of the information, the Bureau of the Census, in Washington, D. C., most of such figures as may be required for any particular subdivision of the industry can be obtained.

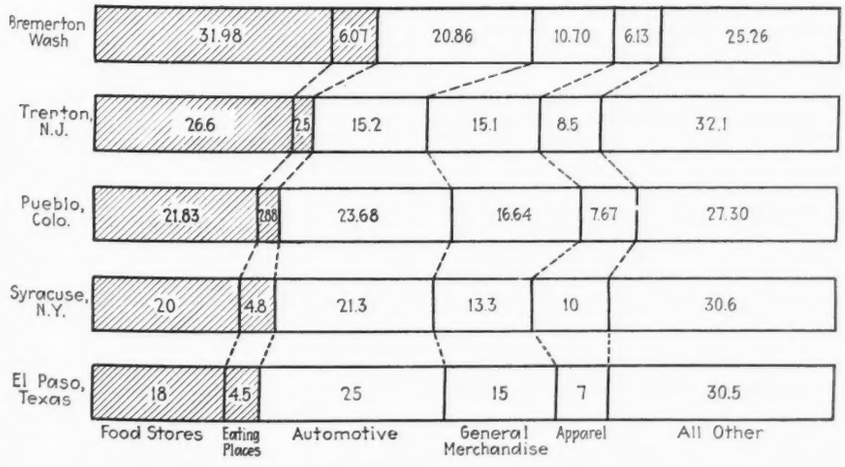


Where Food Is Consumed

Consumption Is in Proportion to Population

IF THE TOTAL POPULATION of the United States be divided into quarters, it will be found one-fourth of the people live in the 23 most congested counties, one-fourth in the 213 next most populated counties, one-fourth in the next 744 counties and the remainder are thinly spread over the balance of the country. On the map the areas of heaviest concentration are black, and, as the concentration decreases, the shading is lightened.

Foods Form the Largest Item of Total Retail Sales in Typical Communities

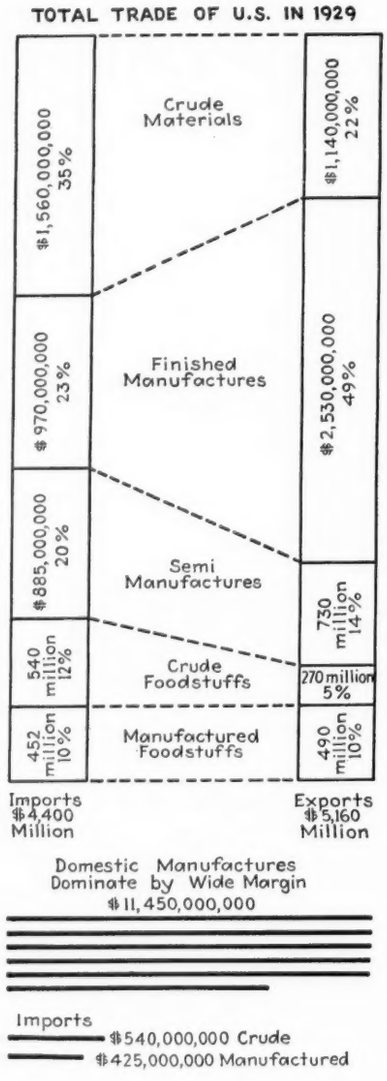


Most Heavily Populated Counties

County	State	Population in Thousands	Rank
Cook	Illinois	3,973	1
Kings	New York	2,605	2
Los Angeles	California	2,202	3
Philadelphia	Pennsylvania	1,964	4
Wayne	Michigan	1,892	5
New York	New York	1,872	6
Allegheny	Pennsylvania	1,375	7
Bronx	New York	1,267	8
Cuyahoga	Ohio	1,201	9
Queens	New York	1,079	10
Middlesex	Massachusetts	935	11
Suffolk	Massachusetts	880	12
Essex	New Jersey	834	13
St. Louis City	Missouri	822	14
Baltimore City	Maryland	805	15
Erie	New York	761	16
Milwaukee	Wisconsin	719	17
Hudson	New Jersey	691	18
San Francisco	California	637	19
Hamilton	Ohio	589	20
Providence	Rhode Island	540	21
Hennepin	Minnesota	518	22
Westchester	New York	517	23

How Food Enters World Trade

Of the United States



IMPORTS

Into the United States in 1928 and 1929

Abbreviation n.e.s.=not elsewhere specified)

(In thousands of dollars; that is, 000 omitted)

Data from: Foreign Commerce and Navigation of the United States, 1929, Vol. 1, U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce

	1928	1929
Crude foodstuffs	549,891	538,560
Free of duty	431,586	443,372
Cattle	1,288	1,560
Fish	6,423	7,677
Wheat	.....	16,219
Chick Peas	3,353	3,263
Fresh vegetables, n.e.s.	12	.....
Bananas	35,377	36,048
Coconuts	4	.....
Chestnuts	1,055	849
Coffee	309,648	302,397
Tea	27,222	25,866
Cocoa	47,205	49,493
Dutiable	118,305	95,188
Food animals	21,175	20,624
Cream and milk	6,894	5,989
Fish	7,801	8,110
Eggs, in the shell	83	91
Grains	23,314	1,255
Hay	564	319
Beans and Peas, dried	6,691	7,645
Vegetables, n.e.s.	13,859	14,098
Fruits	7,585	11,237
Nuts, n.e.s.	10,985	8,344
Spices, n.e.s.	18,554	16,581
Sugar cane, natural	801	893
Manufactured foodstuffs	405,815	423,622
Free of duty	75,115	82,375
Lobsters, canned	1,005	937
Animal oils and fats, edible	16	24
Sausage casings	12,586	15,420
Grains, preparations of	511	524
Oilcake and oilcake meal	4,695	6,715
Farinaceous substances	3,915	4,711
Fruits, n.e.s.	165	245
Coconut meat, prepared	4,005	3,395
Sugar	47,786	49,982
Molasses	.....	77
Lemon, lime, and sour orange juice	269	168
Ginger ale	163	44
Article in this class, ordinarily dutiable, imported under special provision, free	.....	133
Dutiable	330,700	341,247
Meats	23,047	25,474
Milk, condensed	980	1,107
Butter and cheese	26,355	23,319
Fish	23,313	23,048
Animal oils and fats, edible	1,328	170
Eggs, preserved, and egg albumin	6,696	8,493
Meat extract	795	936
Gelatin, edible	425	722
Grains, preparations of	2,628	2,006
Fodders and feeds	10,448	10,420
Vegetables, preparations of	12,071	18,080
Fruits	15,320	11,273
Nuts, shelled	15,167	15,502
Vegetable oils and fats, edible	14,958	16,419
Cocoa and chocolate	2,012	1,778
Spices, n.e.s.	2,033	2,049
Sugar	159,262	159,296
Molasses	10,237	15,946
Candy and confectionery	976	1,012
Maple sugar and maple syrup	1,225	2,509
Honey	25	24
Beverages	1,398	1,664

With trade in food constituting 18½ per cent of the total foreign trade of the United States, and imports of food supplying only 8.4 per cent of the domestic requirements for food, it is evident that the market for food within the country forms, and must form, the principal dependence of the food grower and manufacturer.

However, no one in the food industry can afford to neglect the relation of this foreign trade to his activities. Exports form a cushion that may well take up the impact of future surpluses, while imports directly compete for the food dollars of the domestic consumer.

EXPORTS

From the United States in 1928 and 1929

(In thousands of dollars; that is, 000 omitted)

Data from: Foreign Commerce and Navigation of the United States, 1929, Vol. 1, U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce

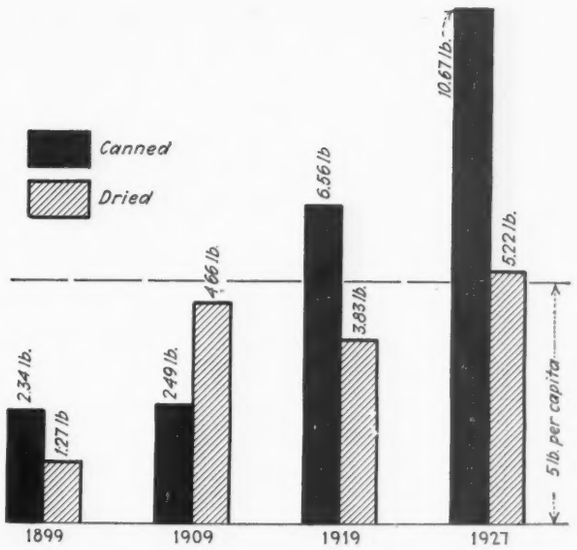
	1928	1929
Crude foodstuffs	294,677	269,590
Animals, except horses, mules, etc.	2,163	1,651
Eggs in shell	6,135	4,081
Milk and cream, fresh and sterilized	73	104
Fish, fresh	959	1,104
Grains	213,856	176,929
Hay	303	267
Kafir and milo	1,194	2,338
Vegetables, dried and fresh	10,239	11,997
Fruits, fresh	56,162	68,660
Nuts	1,529	1,481
Coffee, green	2,066	980
Manufactured foodstuffs	465,811	484,304
Meats	60,942	72,459
Eggs and yolks, frozen, dried, or canned	87	62
Milk, condensed, evaporated and dried	15,130	14,670
Butter	1,861	1,750
Cheese	799	735
Infants food, malted milk, etc.	632	656
Fish, except fresh	19,826	22,397
Animal oils—Oleo oil	8,281	7,501
Oleo stock	862	860
Tallow	287	327
Lard	98,701	105,530
Neutral lard	3,225	2,447
Lard compounds, containing animal fats	613	457
Oleo and lard stearin	436	440
Oleomargarin of animal or vegetable fats	108	152
Meat extracts and bouillon cubes	366	400
Gelatin	159	169
Sausage casings	6,780	6,297
Grains, preparations of	101,838	109,428
Oil cake and oil-cake meal	27,198	28,414
Prepared and mixed feeds	1,000	932
Other feeds, including screenings	1,200	795
Vegetables, canned	8,692	9,454
Pickles and sauces	2,716	2,646
Vinegar	140	168
Yeast	634	693
Other vegetable preparations	245	412
Fruits, dried and evaporated	39,607	34,281
Fruits, canned	26,759	31,365
Preserved fruits, jellies and jams	383	455
Other fruit preparations	4,885	1,225
Cottonseed oil	4,657	2,388
Corn oil	50	42
Cocoa butter	778	126
Vegetable oil lard compounds	1,349	1,483
Cocoa, powdered	351	447
Chocolate, including sweetened	226	204
Coffee, roasted	760	1,116
Coffee extracts and substitutes	710	761
Spices	273	298
Sugar	8,548	6,104
Molasses	959	769
Confectionery	2,766	2,675
Chewing gum	1,353	1,547
Honey	971	775
Glucose (corn syrup)	4,280	4,412
Grape sugar (corn sugar)	295	269
Syrup, including maple	905	973
Beverages	2,189	2,381

Consumption of

CANNED GOODS

Shows Continued Increase

By E. G. MONTGOMERY
Chief Foodstuffs Division,
U. S. Department of Commerce

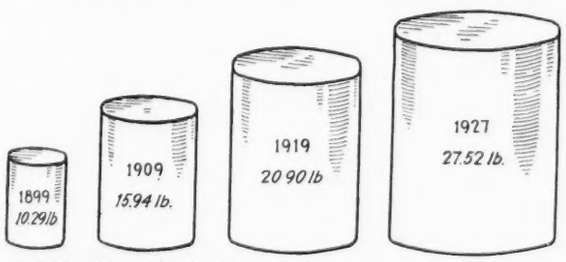


Per capita consumption of canned and dried fruit

THE canning of food products has had remarkable development in the last 30 years. The consumption of canned fruit, for example, in 1899 is estimated to have been less than 2½ lb. per capita, and by 1927 it had risen to 10½ lb. per capita. The consumption of canned vegetables in 1927 is estimated at about 28 lb. per capita, although in 1899 it was but slightly above 10 lb. per capita. In other words, the consumption of canned fruits is about four times as much as it was 30 years ago, and that of canned vegetables three times as much.

It is interesting to note that the consumption of domestic dried fruits also has had a remarkable development. If we take the five principal dried fruits for which data are available—namely, prunes, raisins, apricots, peaches, and currants—we find that in 1900 the per capita consumption was about 1.2 lb., whereas the average for the three years 1923-25-27 was 6.4 lb. As a matter of fact, the whole increase in per capita consumption of fruits in the United States during the past 30 years appears to be the result of increased consumption of the processed fruits rather than of fresh fruits.

Per capita consumption of canned vegetables



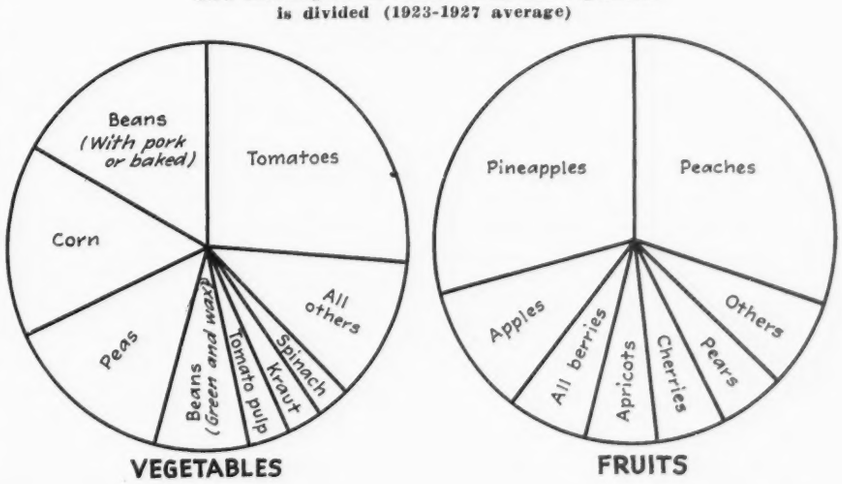
Height of cans indicates relative consumption

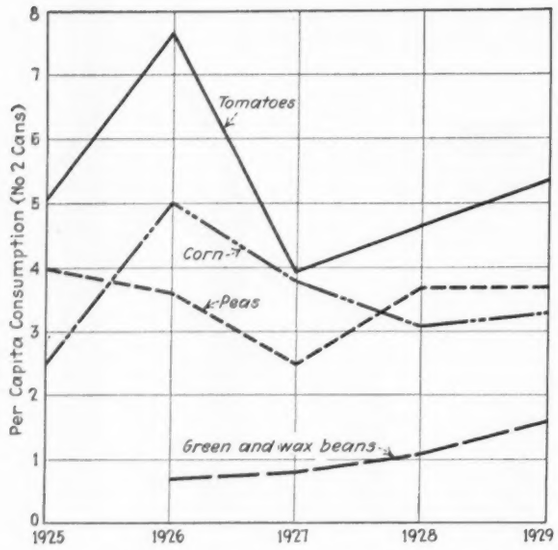
Taking the twelve principal fruits on which we have fairly good data for the past 30 years, we find that in 1899 about 169 lb., in terms of fresh fruits, was consumed per capita, of which about 7 lb. was processed, while for the last three years for which data are available, the total consumption in terms of fresh fruits totaled 192 lb., of which approximately 26 lb. was processed. In other words, the consumption of fresh fruit as such has remained very nearly the same, but the consumption of fresh fruit which has been processed has increased from 7 to 26 lb. per capita. Unfortunately, detailed statistics are lacking as to the relative development and increase in popularity of the different kinds of fruits which are consumed in cans. We know, however, that there has been a very great increase in the consumption of canned peaches, pears, and pineapples, and a large increase in the production of dried prunes and raisins. Two or three canned fruit products have come on the market in recent years. Canned pineapple was almost unknown 30 years ago, while canned grapefruit has been developed largely within the past five years.

It would be interesting to trace out the development in the export trade of both canned fruits and vegetables, but suffice it to say that it has grown from an export of relatively small importance, valued at $2,886,406 in 1899, to approximately $40,818,461 worth of exports in recent years.

It is estimated that we consume the equivalent of a total of about 300 lb. of vegetables, in terms of fresh products, per capita, but about 40 lb. of this is converted into canned products. We have about fifteen

How consumption of canned fruits and vegetables is divided (1923-1927 average)





Trends in consumption of canned vegetables

canned vegetable products, of which the outstanding in importance are tomatoes, corn, and peas. These three constitute about 16 lb. of the total of 26 lb. per capita of canned vegetables. Canned green beans, however, now equal more than 2 lb. per capita, and canned pork and beans amount to more than 4.7 lb. per capita.

According to the best estimates available, the approximate annual consumption per capita of all fishery products is about 15 lb., of which approximately 3½ lb. is canned fish. Canned salmon alone represents about two-thirds of the canned fish consumed, or 2.2 lb. per capita, while sardines represent about 0.75 lb. per capita. The rest is made up of a variety of fish products, such as tuna, shrimp, oysters, and clams. The figures available for consumption of canned fish for 1899 indicate about 2 lb. per capita, largely made up of salmon and sardines.

It is rather interesting to note that although most fruit and vegetable products can be canned satisfactorily, and find a wide market more or less in proportion to the normal consumption of these products, yet among the great numbers of varieties of fish available for food, salmon is about the only fish that has proved popular on a large scale as a canned product.

It is interesting also to speculate as to why the consumption of both canned fruits and vegetables has had such a rapid development. Many reasons can be advanced, but probably the most important is the great development in mass production, which has enabled the trade to put out these products not only in good standard quality but at a relatively low cost. They are not cheap food products, when compared with such old standard commodities as bread, meat, potatoes, and sugar, but they are decidedly not in the luxury class of foods. The art of canning has not only made highly perishable and seasonable fruits and vegetables available the year round but available in all sorts of inaccessible places distant from the market. The general improvement in the standard of living throughout the country also has been a large factor in enabling millions of people to vary their diet and purchase a certain amount of more interesting and tasty foods. This no doubt has been a very large factor in expanding the market for canned products.

Per Capita Consumption of Canned Fruits and Vegetables

(In Pounds. Average 1923-1927)

Corn	4.30	Peaches	3.00
Peas	3.90	Pears	0.55
Tomatoes	7.40	Raspberries	0.15
Tomato pulp	0.82	Blackberries	0.21
Tomato paste	0.27	Loganberries	0.12
Tomato sauce	*0.06	All other berries	0.21
Beans, with pork, with sauce, or baked	4.70	All berries	0.64
Beans, green, wax, and others	*2.10	Apricots	0.57
Asparagus	0.55	Cherries	0.52
Spinach	0.79	Fruits for salad	0.25
Kraut	0.98	Apples	1.02
Beets	*0.25	Prunes	0.12
Pumpkin and squash	*0.44	Olives, ripe	0.11
Sweet potatoes	*0.30	Plums	0.06
Hominy	*0.52	Grapefruit	0.10
Pimentoes	*0.10	Pineapples	2.91
Spaghetti	*0.61	Total‡	9.90
Total†	28.09		

*Average of 1923-1925-1927 figures.
†Does not include a small quantity listed under all others.
‡No comparable data for varieties of fruits not listed, but this quantity negligible.

▼ ▼

Production of Canned Peas and Corn

THE Bureau of Foreign and Domestic Commerce of the Department of Commerce has compiled the statistics of production of canned peas for 1930, and the detailed figures are given below. They are based on questionnaires returned by all but four canners of peas, and represent about 99½ per cent of the total pack.

Production of Canned Peas, 1930

(In terms of cases of 24 No. 2 cans)

	1930	1929*
Wisconsin	10,491,727	†9,399,000
New York	3,164,083	1,683,000
Michigan	880,130	558,000
Indiana	564,070	404,000
Maryland	399,918	1,469,000
Ohio	208,009	337,000
Delaware, New Jersey	73,719	383,000
Utah	1,662,445	1,241,000
California	‡	39,000
Illinois	1,560,263	767,000
Minnesota	1,333,074	926,000
Montana	518,554	381,000
Pennsylvania	97,291	225,000
Washington	‡	202,000
All other states	1,081,939	516,000
Total	22,035,212	18,530,000

*Collected by National Canners' Association.
†Collected by Wisconsin Canners' Association.
‡Included in all other states.

Pea Pack by Sizes of Containers

Size	Cases
48—No. 1's	1,597,986
24—No. 2's	17,712,962
6—No. 10's	1,550,307
48—No. 55's	378,802
Other sizes	349,997

The 1930 pack of canned corn, according to figures collected by the Foodstuffs Division of the Bureau of Foreign and Domestic Commerce, totaled 15,692,172 cases, on a basis of 24 No. 2's, a decrease of 1,794,572 cases, or slightly more than 10 per cent, from the 1929 pack. Distribution of the pack by states, with 1929 comparisons, is given below:

1930 Corn Pack

(Basis 24 No. 2 cans)

States	1929	1930
Iowa	2,908,296	2,552,023
Illinois	3,152,800	3,261,074
Maine	1,521,000	*1,929,864
Ohio	1,550,999	749,983
Maryland	1,865,311	621,961
New York	782,105	646,760
Wisconsin	546,639	685,974
Indiana	1,250,029	1,272,291
Minnesota	2,604,063	2,911,895
Delaware	170,654	192,376
Vermont	146,650	*
Pennsylvania	229,157	96,968
Nebraska	273,277	275,768
All other states	485,764	495,235
Total	17,486,744	15,692,172

*Vermont included with Maine.

TECHNICAL PROGRESS
During 1930

Through the entire group of interests that make up the food industry, so many technical advances were made during the past year that it is impossible to touch on them all in the limited space available here. For this reason the editors of FOOD INDUSTRIES have limited their comments to those outstanding examples of progress that seem likely to affect the future course of food manufacturing.

Canning

TOMATO JUICE in glass and tin cans was the outstanding commercial development of the past year in the canning field, most of that put up being excellent. The better informed concerns realize that exercise of the greatest care in preparation is necessary if the new product is to grow as rapidly as it deserves.

Whole grain corn, either with brine or packed dry in vacuum cans, is in the stage of active commercial development. Corn packed in this way possesses a natural flavor that appears to be meeting active consumer approval.

Jointed chicken is another 1930 development in canned foods. This makes canned chicken available in three forms: boneless, whole, and jointed. Packing whole chicken is now beyond the experimental stage.

Irish potatoes were canned in Florida last year. The potatoes are the No. 3 size, too small for sale through ordinary channels. Additional pork and bean canners have turned to the true oven-baked pork and beans with its 12-hr. bake.

Vacuum packing is not confined to corn alone but is being studied with many other products which, however, have not yet reached the stage of development of vacuum-packed corn and peas. The canning industry is alert to the commercial hazards of the changing times and probably will meet the advent of frozen fruits and vegetables with an improved technology in which vacuum canning will play an important rôle.

Probable future development will also be toward quicker methods of sterilizing and either transparent containers or window cans. Another trend of the year is the greatly increased use of interior-enameled cans for both fruits and vegetables.

Beverages

FREEZING to concentrate or to preserve fruit juices for beverage purposes is developing rapidly. The trend closely parallels the trend away from the old style, imitation flavored carbonated drinks toward genuine fruit flavors for this class of beverages.

A development that is slowly emerging from the research stage into commercial tests is the Heyman process, by which sterile carbonated beverages are produced by pasteurizing before carbonating. Concentrated syrups are heated to pasteurizing temperatures, then measured into sterile bottles, and next filled with sterile boiling hot water under pressure. Still under pressure, the neck space is now filled with compressed CO_2 gas and the bottle is crowned. After cooling, the CO_2 is absorbed by the liquid.

A variation of the process, for chocolate milk, is the addition of a hot liquid concentrate made from a mixture of powdered milk and cocoa powder with sugar to sterile bottles, followed by filling with water at 260 deg. F. under pressure, crowning, and cooling at an appropriate rate. Here the temperature is high enough to sterilize the entire contents of the bottle.

The "Electropure" system of electrical pasteurization, which has been used with success in the dairy industry, is being tested experimentally in the beverage field for the production of sterile fruit juices without impairing the flavor.

Fruit juices are preserved in another way by evaporation in a vacuum at a very low temperature to a thick liquid, which is then mixed with granulated sugar and dried. This gives a crystallized product for shipment to bottlers.

Milling and Baking

THE Secretary of Agriculture has grouped wheat flours into two classes and defined them so that there should be no further confusion in specifications.

Despite the fact that sliced bread was introduced as a novel way in which to merchandise a staple article it has been responsible for many and far-reaching developments in the baking industry. The 1929 type of slicing machine has been superseded by numerous types that are more automatic and uniform in operation, that are synchronized with other equipment, especially the wrapping machines, and some that have eliminated the cardboard trays.

More significant to the public than the development of these machines has been the raising in quality of the bread to be sliced. Some baking concerns jeopardized their business of the moment by refusing to put sliced bread on the market until a satisfactory loaf for slicing purposes could be developed by them. These companies now report a continued increase in sales and state that unprofitable plants became profitable through the production of this specially developed bread.

During this period of higher quality bread for slicing purposes impetus has been given to more general use

of such moisture-retaining and nutritious materials as invert and malt sugars, high-grade molasses, cheese, and higher percentage of milk solids in bakery products. Also consideration is being given to the setting forth of specifications for "milk bread." During 1930 there has been a move on the part of the wholesale bakers to enter the specialty field, which heretofore has been left largely to the retail baker. Further, common doughs are helping to simplify plant operations. In this way a basic sweet dough can be used for nut breads, sweet rolls, cookies, or doughnuts, as the demand may require.

Improvements in the manufacture of transparent, moisture-proof wrapping materials and machines for making use of these materials have made marked changes in merchandising. Such bakery products as pies, cakes, cookies, and doughnuts are affected.

Dairy Industry

THE trend of 1930 has been to make the various dairy processes more automatic. Most of the equipment for the industry has been redesigned in the interest of efficiency, sanitation, and space economy. Distinctly new equipment is found in the flexible chain conveyors that have appeared this year; a vacuum filling machine for fluid milk which is non-spilling and non-dripping; and a centrifugal cream separator that will produce 83 per cent cream. In this concentration, cream is a solid at ordinary temperatures. It can be either worked into butter or diluted with skim milk back to any desired concentration.

Canned cream of 18- and 36-per cent butter fat content, under the trade name "Pantry Cream," has made its appearance. Although only a few months old, the new product is showing an important increase in sales.

Pickles

IN THE pickling industry no new technical developments occurred in 1930. Research, however, has been continued by several firms to find a way to cure dill pickles in tanks. This is in contrast to the usual method of curing in barrels, but the results obtained to date have been very disappointing. Spoilage of pickles in 1930 has been unusually large and needs further study.

Vitamin Incorporation In Commercial Foods

DIFFERENCES of opinion have developed among food manufacturers during the past two years as to the commercial value of vitamin incorporation in foods as a feature that will add to its marketability. The physiological importance of the vitamins is unquestioned. It is known, however, that certain scientific researches are under way that indicate a profound change of future thinking may take place about the place of vitamins in the dietary.

Irradiation of food products or the incorporation of irradiated ergosterol has been exploited to only a limited degree by food manufacturers, for reasons that cannot be discussed in the space available. Ultra-violet irradiation apparently is being applied commercially only in the case of certain cereal products, dried milk, and yeast. Several malt extracts are on the market to which vitamin D has been added.

Supplementing food products by vitamin B is practiced by the makers of certain infant foods, yeast confections, and one root beer. Apparently only one margarin manufacturer is incorporating a vitamin concentrate to supply the lacking vitamins A and D. This is being done abroad more generally than in the United States.

A brand of whole-wheat biscuit has appeared containing yeast, butter, and irradiated wheat germ. It is stated to contain vitamins A, B, D, E, and G. A spinach concentrate also is being marketed for which high vitamin potency is being claimed.

Intensive research is being prosecuted by a large dairy to find a way of producing milk which will contain satisfactory quantities of vitamin D as it is drawn from the cow.

Mayonnaise Manufacture

ALTHOUGH no striking developments have occurred in mayonnaise manufacture, it has been a year of steady improvement in the products, and gradual elimination of problems of fermentation and separation. Improved resistance to the physical rigors incidental to marketing has been developed, but, as yet, no marked progress has been registered toward extending the merchantable life of the flavor. It appears that much remains to be done here.

Federal standards for mayonnaise have been announced which, it was hoped, would place competition on a sounder basis, but it has not yet produced that effect. If mayonnaise were sold by weight instead of volume the standards might possibly be more effective in attaining this end.

Coffee

RECENT researches have disclosed a method of measuring quantitatively the staleness in coffee and of accurately matching well-known blends. The past year has seen an increase of 10 per cent in the quantity of coffee consumed over 1929. Vacuum packing and systematic lowering of elapsed time between roaster and consumer probably are largely responsible for the increase. Definite trend is being made to combine coffee delivery with that of such perishable products as bread and yeast. In fact, some bakers are adding coffee roasting to their business.

Confectionery

THE past year has been marked by the appearance of considerable equipment for reducing labor, increasing production, and giving better control on processing operations. The greater part of this new equipment emphasizes production of confectionery on the large-scale basis in contrast to the small candy-kitchen basis that was almost universal until a few years ago.

Perfection of transparent moisture-proof packaging material during late 1929 and early 1930 has almost

PROGRESS

revolutionized packaging of confectionery during the past year. The cost of this material has been so greatly reduced and its quality so markedly improved that it is now in quite general use, whereas a year ago only the luxury type of confectionery was packaged in it.

These developments show that confectionery made marked progress during the year toward being universally recognized by its producers, merchandisers, and consumers as a food worthy of all the care and consideration that other foods get in connection with their processing and merchandising.

Casein Manufacture

A CONTINUOUS method has now been evolved for this process, and standardized casein, highly regarded by paper manufacturers, is being produced. One man can isolate, wash, and drain the casein from 300 to 400 cans of skim milk per hour with the new apparatus. A continuous dryer is also being developed. An increase in the use of domestic casein may be expected as a result, particularly as standardization on the part of domestic producers progresses.

Infant Foods

MANUFACTURE of foods for infants is very closely tied up with the dairy industry, for the majority of them are modified milks. One concern which is making rapid progress has instituted a policy of co-operative research for qualified pediatrists, leading to development of individual formulas.

Technical developments in the field include introduction of new methods of automatic spray drying and such exact control that the bacterial counts in the dried products are below 10,000 per gram.

Spoilage Prevention

IF ONE looks over the list of radically new developments made during the past year or two he finds a surprisingly large number of cases in which the introduction of a new chemical for foodstuff treatment has been the occasion or an opportunity for progress. Ethylene for maturing of citrus fruits, for blanching of celery, and for numerous other "ripening" tasks, is now a recognized reagent of our industries. Fungus or mold control, formerly thought impractical or useless, because the dealer and not the manufacturer suffered the loss, is now recognized as a legitimate and necessary task of the producer. Within this field the borax treatment of oranges is only one outstanding case where a marked improvement in merchandising practice has at once followed the development of satisfactory mold-control.

Disinfection for control of insects and rodents about food plants is increasingly important and, fortunately increasingly easy. There are numerous systems of fumigation more or less widely applicable that deserve consideration as a result of recent scientific and technical advance.

Fresh Fruit and Vegetables

THE fact that consumption of green foods in the United States has doubled in the last seven years, that total carload shipments of fresh fruits and vegetables are now more than one and one-half times what they were in 1920, might superficially be considered as disadvantageous to food manufacturers. Certainly it means increasing competition for makers of canned, dried, and preserved products. Yet the ability to transport fresh fruits and vegetables over long distances with substantially no depreciation in quality at any season of the year has itself become a processing operation equal in complexity, as well as opportunity, to the more typical factory operations on foods.

Although the development of an absorption system refrigerator car may not be an immediate challenge to ordinary refrigerator-car practice on economic grounds, except for high quality shipments, it is certainly a challenge on the grounds of efficient circulation, insulation, and temperature control.

Preserving Industry

THE question of legal standards for preserves has been uppermost in the preserving industry during 1930, and the bill now before Congress has been so mutilated and amended that its original form is hardly recognizable.

The vacuum pan with its new improvements is the latest tool of the industry, but many preservers have not made the best use of it through their failure to master the details of the correlations that exist between fruit structures and pan operation. The information is available, but as yet is largely unused.

Introduction of new designs of glass containers, particularly along modernistic lines, has in some cases resulted in new problems of filling and mechanical conveying in the factory.

Fishing Industries

THROUGH the efforts of technologists in the fishing industry the art of quick-freezing has developed and it is now rapidly spreading to all other branches of food preservation. New developments in 1930 include a new type of quick-freezing apparatus which has not been officially announced, and the standardized fish steak. Efforts are being made to produce a satisfactory automatic fish-skinning machine, but so far it is still in the development stage.

Packaged Meats

FURTHER expansion in the packaging of fresh as well as frozen consumer cuts of meat seems assured as a result of successes of the past year. Packaging of such meat products as bacon, ham, and sausage has, of course, been practiced for many years. Extension of the same principles to chops, steaks, and other meat cuts is facing considerable opposition, particularly from meat dealers who foresee mechanization of cutting and possible competition from 400,000 retail outlets which never before handled meats. Nevertheless, public consciousness of brand names and sanitation is increasingly in its favor.

Savings in centralized cutting, accurate cost control,

labor, and store space and equipment in H. C. Bohack & Company chain stores more than compensated for packaging expense, refrigeration, and return losses. "Demonstration" stores retailing government-graded "choice" cuts in esthetic surroundings, installed by Hygrade Food Products Company, New York City, to convince dealers of the merits of the system, have exceeded estimated economies. The company plans to supply packaged cuts to independent merchants.

Whether or not freezing is economically advantageous in connection with packaging appears to depend upon the character and area of the distribution system.

Progress on the Pacific Coast

CANNING and preserving is, of course, the principal food industry of the West. A significant advance in the peach canning industry last year was the large increase in the number of peach pitters used. Two types have been developed: one rings the peach with knives and takes out the pit with a spoon shaped knife, much as is done by hand; the other uses a pair of fine wires that begin cutting the peach together at the stem end, divide when they reach the pit, cut around it, and finally finish the cut together again. The makers of this last machine declare that, with it, one pitter can do the work of six hand pitters.

The second significant advance in canning was made among the sardine canners. The work is the culmination of several years of research, showed results first in 1930. The California sardine *(Sardinia caerula)* has been canned for a long time, but with little attention paid to the quality of the pack beyond seeing that it was sterile. About three years ago it was seen that the only way that an adequate return for the canned sardine could be obtained was to increase the quality so that it would find a place in the domestic markets. To do this there would have to be a marked improvement in the flavor.

The old way was to cook the fish in steam, drain, and allow to cool and become firm, pack into cans with oil or sauce, and then retort. This meant a batch process with more or less exposure of the fish to oxidation of the oils before canning them. The canned product held up well but left much to be desired in the way of flavor. In the newer "raw-pack" processes the fish are packed raw in oval cans, cooked with steam, drained in the cans; then cooked again either with steam, radiant heat, or by dry heat; and finally sauced and retorted. The resulting product is much improved in flavor and the canning is speeded up considerably.

The transparent package, either complete or with cellophane windows in a fiber carton, has found increasing use during the last year. The question of sulphur in dried cut fruits has occupied the attention of research workers, both from the point of view of more efficient sulphuring and its nutritional effects. Very recently it has been found that vitamin C content is not affected by sulphuring; on the contrary, sulphured fruits may retain a higher proportion of this vitamin than unsulphured. Sun-drying continues to be the most widely used method in California, artificial methods of dehydration having made little progress.

Citrus-packing-house equipment made material advances in the form of a mechanical lemon grader—also usable for oranges—and a very compact form of washer and drier that saves about 1,200 sq.ft. of floor space. The research laboratory of the California Fruit Growers' Exchange reports the successful preparation of a dried lemon juice derived entirely from lemons.

Bakers have been looking with interest on a new type of combined divider, proofer, and molder in use in a Los Angeles shop, which is said to be more than ordinarily accurate and rapid on dough of any consistency.

New beet-sugar factories have been built, one of them introducing the innovation of storing finished sugar in silos rather than in bags. This is frankly an experiment, but certainly an interesting one. Liquid sugar for confectioners and canners' use made its appearance on the Coast in 1930, and a plant is now being built at Stockton for its manufacture.

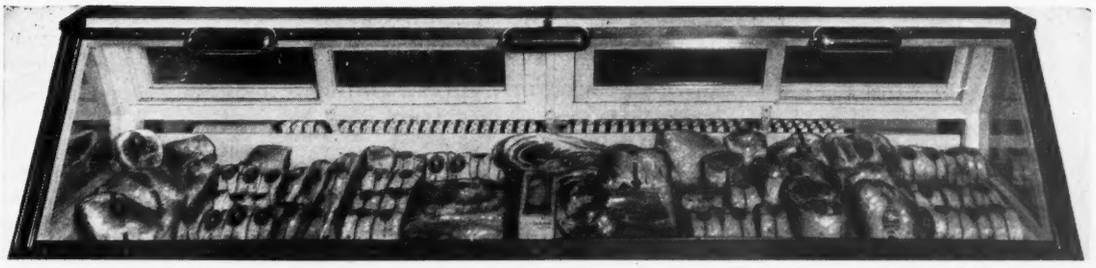
One of the sugar refineries on San Francisco Bay has been making considerable progress on two rather revolutionary steps in sugar refining. These are the use of a vacuum filter instead of centrifugal separation for separating sugar crystals from the molasses in the massecuite, and the working out of a process of boiling sugar to grain automatically. The first and simpler of the new methods has been quite successful, and the second fairly successful on soft sugars.

Natural Gas Influences Technic

CONSTRUCTION of pipe lines for the long-distance transmission of natural gas continued actively during 1930, and gas from completed lines became widely available during the same period, throughout 36 of the 48 states. This change in the fuel supplies of the country is already beginning to affect the economy of operation in food manufacturing plants and to cause changes in the processing of foods, both as to equipment and methods used. Another result has been to widen the possible choice of factory sites having the advantage of cheap and efficient fuel.

Examples of such effects of natural gas availability are still few, but the results so far obtained indicate what may be expected in the future. For instance, on the Pacific Coast, gas for bread baking gives a fuel cost of about 37 cents per 1,000 lb. of bread, whereas electricity at present rates makes this figure 90 cents to $1. In drying food products, such as milk, direct heating with the products of the combustion of natural gas is permitting the use of simpler, cheaper equipment, and is producing larger quantities at lower cost. Because of the ease and accuracy of heat control with natural gas, its use as a direct heating medium is superseding the use of indirect methods depending on steam. The consequent saving in equipment and labor costs, because no boiler is needed, results in important gains.

With the promise for betterments held forth by these instances and the assurance of a more widely available supply of the fuel at reasonable prices, a widespread revamping of equipment and methods is certain to occur. Fortunately, the food manufacturer need not undertake such changes unaided. The American Gas Association and individual gas utilities are active in industrial developments and will gladly co-operate with the prospective users. Also, equipment manufacturers are certain to be in the forefront of any movement that embodies improved equipment.



Husmann Refrigerator Company

FROZEN FOODS—*Today and Tomorrow*

THE prophesied revolution in the production and marketing of foods as a result of advances in freezing methods and distributive refrigeration is constantly becoming more tangible. Like most revolutions, however, progress of frozen foods is meeting its full share of the hubbub, ignorance, and disorganization that harass all departures from customary routine.

Generalizations which ascribe to speed of freezing alone the solution of all production problems in the industry, although still being blazoned to the public, are now regarded more circumspectly by the industry.

It it generally agreed, however, that quick-freezing is necessary to preserve flesh products without impairment of quality or flavor. The point over which confusion still exists is just what practical limits are to be included by the term "quick-freezing." Those who favor freezing by means of metal surfaces in contact with brine, as exemplified by the Birdseye system, have generally held that quick-freezing with air as a refrigerating medium is uneconomical. Yet a number of meat packers, including Swift & Company, are producing frozen meats of undeniable quality by air-blast freezing. Nor is this method merely a makeshift, for practically all the large meat packers, and many of the smaller ones, have tried and are still conducting extensive experimentation with all kinds of freezing methods.

The sale of meat and fish frozen in an ordinary sharp-freezer as "quick-frozen" products, presumably to take advantage of public interest in the newer developments, is regarded as a serious threat to the industry. By special pre-treatment and careful manipulation, small and correctly packaged fish fillets have been sharp-frozen without deterioration in experimental work. This is a far cry, however, from freezing of unwrapped meat and fish products in bulk by ordinary sharp-freezer practice and then marketing them as a new development in spite of obvious cell breakdown and dehydration.

Frederick S. Snyder, president of Batcheldor, Snyder, Dorr & Doe, a subsidiary of General Foods Corporation, announced at the packers' consent decree hearings that a new self-contained plate freezer with seven series of freezing surfaces has been developed by the latter organization. Other new freezing equipment includes a direct-expansion apparatus developed by C. L. Ashley and Albert V. Rudd. A commercial test of this equipment will be made in February or March. A continuous, indirect-contact brine freezer suitable for all products, but particularly adaptable to poultry, has been developed by the Quick-Freeze Corporation, which also is manufacturing a small freezer for experimental work.

The fact that plant products offer an entirely different problem for freezing than do animal products has only recently received the emphasis it deserves. For a number of such foods, inelastic cell walls result in cell-breakdown, no matter what the speed of freezing may be. For instance, Clarence Birdseye has pointed out (FOOD INDUSTRIES, Vol. 2, p. 371) that a strawberry frozen in liquid air has its cell structure just about as thoroughly destroyed as would have been the case if the berry had been slow-frozen. The use to which products are to be put (for example, cherries going to pie bakeries), may still justify sharp-freezing in bulk on economic grounds. At any rate, over 100,000 50-gal. barrels of cherries were frozen in this way last year. This does not mean, however, that for these products, rapidity of freezing is an unimportant point. Problems of oxidation, bacterial spoilage, and concentration of salts and colloidal material in segregated masses as water crystallizes, are more acute when the freezing is slow.

In considering the freezing of fruits and vegetables, a clear-cut distinction must also be made between those which are to be cooked before consumption and those which are to be used in a fresh state. In the case of spinach, it has been pointed out that cell breakdown is an advantage rather than a disadvantage, because it shortens the cooking time. With other vegetables of the same general characteristics, technical difficulties of freezing are not so perplexing as are the economic factors in competing with unfrozen and canned foods.

The greatest possibilities for frozen plant products obviously lie in the production of fruits and fruit juices which, when defrosted, will completely simulate the fresh product. The production of frozen Georgia peaches (FOOD INDUSTRIES, Vol. 2, p. 410, 496-498) has been one of the most prominent of such achievements up to the present time. Frozen raspberries comparable in flavor to the fresh fruit have also been commercially successful.

In experimental work carried on by the Georgia Experiment Station, as well as in commercial operation at the plants of Tom Huston Frozen Foods, Inc., and Polar Products, Inc., much research was devoted to prevention of oxidation. By reducing peeling, slicing, and packaging time, by completely covering the peaches with 30 to 35 per cent sugar syrup, and by rapid freezing of air-tight packages not larger than 1 lb., discoloration from this source is practically eliminated, according to the findings of the experiment station. At the plant of Polar Products, Inc., tumbling the products during freezing has been introduced as an additional precaution.

Packing under vacuum to prevent oxidation of frozen

fruits has been considered for some time. It requires, however, the use of a hermetically sealed rigid container such as the tin can. The use of tin has a number of advantages, such as high conductivity and ease of filling and sealing, but the association of tin packaging with permanent preservation has been so firmly implanted in the mind of the housewife that its use for perishables would require extensive education. Of course, packing in tin without vacuum sealing has been practiced for bulk frozen-pack fruits and eggs on a large scale for a number of years.

What will be the status of the frozen-foods industry a year from today? Generalized predictions appear impossible, but further advances in freezing fish, meat, peaches, and particularly orange juice, can be confidently forecast. Unless some merchandising step that goes beyond the nature of a "test" compels retailers, by competitive example, to equip themselves for the products, merchandising will continue to deter production. But the respite can well be used for imperative research.

Results of the past year indicate that for retail consumer trade, the waxed cardboard cup is the most satisfactory for fruits requiring a liquid-tight container. Development of an equally tight square package would, however, give the advantage of compactness in storage and shipments, it has been pointed out.

Frozen orange juice has been the subject of a great amount of research in the past few months and several commercial applications have already begun. Two general systems have been used for handling this product, one in which the juice is frozen in bulk, shipped to a distributing center, and defrosted and bottled for sale; the other in which the juice is frozen in consumer packages and retailed in this condition. In one development, the juice is frozen as a mush, similar to the practice for ice cream, hardened and shipped in 5-gal. cans. Others plan to fill individual containers with the mush and retail it in solid form.

Difficulties in freezing the juice directly in the containers arise from separation of pure ice crystals from the salts and colloidal material. The concentrated flavor constituents form a core with a lower freezing point at the center of the frozen package. Upon defrosting, the juice may not resume its homogeneous condition.

Changes in flavor due to oxidation during processing have also been a problem. The application of vacuum to the juice previous to the freezing operation is considered necessary by some workers on the subject, and the practical problem of getting the juice into the container without exposure must then be faced. Naturally, speed of freezing has a great bearing on the amount of oxidation and segregation of ice crystals. Patents covering the freezing of orange juice in a flexible moisture-proof wrapper within a rectangular mold have recently been issued to Clarence Birdseye and assigned to Frosted Foods, Inc., General Foods Corporation subsidiary.

Further practical research in the production of frozen foods is certainly vitally necessary, yet all such developments will remain stalemated in the realm of possibilities until a distribution system far more satisfactory than exists at present comes into being. A representative of one of the largest food packers in the country refers to the industry as "a business which, to date, has been unprofitable for almost everyone engaged in it." This may be an unduly pessimistic view—it may still be too early even to expect a return on investment—but the basis of such a conclusion clearly arises from the difficulty of getting frozen foods to the housewife. The actual transfer of frozen products from plant storage to warehouses and from warehouses to retail stores appears not too difficult. The silica gel car, or even salt and ice refrigeration, have answered the first problem satisfactorily, and the refrigerated truck, using mechanical refrigeration or solid carbon dioxide, has practically solved the second. It is the absence of warehouses in necessary locations and particularly the absence of freezer cabinets in the retail stores, that offer the real problem.

The Springfield experiment of the General Foods Corporation has proved beyond doubt that the public will buy frozen foods, and will come back for more. It has proved that when sufficient capital, in the form of advertising and display cases and dealer encouragement, is concentrated in a restricted area, a profitable business can be built up. It has proved, after some difficulty it is true, that satisfactory cases can be built, and has given the manufacturers a great many hints as to what their characteristics should be. For instance, it has definitely settled the fact that a fixed display, with sale from the storage compartment, is satisfactory to consumers.

On the other hand, no experiment has yet indicated who will supply the enormous investment necessary to equip retail stores with cases on a nation-wide basis.

Unless a manufacturer can supply a complete line of frozen food products comparable in price and quality to those of his competitors, it is most likely that cases which he may finance in one way or another will be partially usurped for the products of other manufacturers. And a manufacturer who is bearing the investment charges on hundreds, or thousands, of cases can scarcely meet the price competition of a producer not so burdened, particularly if he has to set up an extensive servicing system over a wide marketing area. The obvious conclusion appears to be that, in the long run, it is the retailer who must supply the case. In this connection, one large company has already abandoned its policy of furnishing even temporary cases.

The reluctance of retail store owners, independent or chain, to purchase cases before an active consumer demand convinces them of the necessity is almost as great now as it was a year ago. Stores in restricted marketing areas where "tests" have been promoted have done so and have achieved a highly publicized success, but they have been few and far between. To "postpone any effort until the thing seems definitely successful," as several have summarized their procedure, is, in effect, to postpone the very effort that would definitely assure success.

There have been reports of one kind or another that some of the larger chains will undertake extensive sale of frozen foods in the near future. If the packers obtain modification of the consent decree, they will be in a position to equip a new set of retail outlets for this purpose. The industry is waiting for the announcement of expansion of the plans of General Foods Corporation based on the success of the Springfield experiment. Any of these moves probably would set a competitive example recognized by every retail store. Meanwhile, those concerned with production can well use the respite granted them to determine more exactly the scientific basis and technological procedure necessary for producing frozen foods of uncompromising quality.

HOW TO GET THE JOB DONE

By LAURENCE V. BURTON
Editor, Food Industries

IF A CONCERN needs to know how to produce better goods, cut costs, eliminate waste, procure improved raw materials; or if it faces a selling problem that involves knowledge of consumer buying habits and preferences, size of market or its purchasing power, somebody has to study the problem and find the answer. The process is research of one sort or another. It may be of the agricultural, mechanical, scientific, or market variety; but it is research nevertheless and requires hard work, intelligence, proper training, and skillful direction. And, like all things that are worth while, knowledge costs not only effort but money. It is to be regarded as an investment—not a necessary expense.

WHEN, however, management deprecates the expense of the conduct of research, what is the proper answer? In one authenticated instance the research director, who was not only a top-notcher in his line but also a highly successful business man, offered to operate the whole department as his own business, charging a royalty on all patents and per diem fees for trouble shooting. A quick check-up showed that such an arrangement would result in a cost for development work that would be about four times greater. The idea was hastily dropped.

IN CERTAIN CASES the results of research can be had for very little or no cost by depending on the research laboratories of concerns which furnish supplies. This is notably true in the container industry. The largest can companies and bottle companies are admirably equipped with laboratories and development departments where customers' problems are studied as a part of sales service. Similar service is offered by manufacturers of shortenings, flour, sugar, yeast, and other commodities. The work done usually is of a very high quality, and if there is any drawback to such an arrangement it would be based on the principle that one manufacturer cannot patent the inventions of another.

THE CONSULTING CHEMIST and the consulting engineer, with their own research laboratories, offer a service for obtaining the solution of a problem without the manufacturer setting up a research department. By this means it is possible to obtain the temporary services of a consultant whose exclusive full-time services on the payroll might cost more than the concern could afford. Often, however, it is desirable to employ the consultant, because of his highly specialized knowledge and broader viewpoint. Some companies employ consultants on problems on which their own research departments are also engaged. The importance of the outside viewpoint and the unbiased investigation must not be overlooked.

FELLOWSHIPS at universities, the Bureau of Chemistry and Soils, and the Bureau of Standards are sometimes established where the fellow carries on research under very able direction. The method is simple and not costly, but the donor of the fellowship is required in most cases to agree by contract to permit publication of the results irrespective of what or how unwelcome the outcome of the investigations may be. Investigations of problems involving the relationships between buyer and seller often are made in this way. Ownership of any patents that may arise from this form of research usually is provided for in the original contract. The American Bottlers of Carbonated Beverages has a fellowship at the Iowa State College of Agriculture, Ames, Iowa, and the Mayonnaise Manufacturers' Association has a fellowship at the Bureau of Chemistry and Soils, Washington, D. C.

SIMILAR arrangements for investigations may be made at research institutions such as the Mellon Institute, at Pittsburgh. In such cases the patents usually go to the donor of the fellowship through some form of assignment. Publication of results may be withheld for a period of time if the donor so desires.

TRADE ASSOCIATIONS in the food field sometimes maintain research laboratories, such as the National Canners' Association, which has three of them working on the broad common problems of the

industry. Laboratories of this type are maintained by the National Preservers' Association, The American Bakers' Association, the Biscuit and Cracker Manufacturers' Association of America, and others.

THE MOST SUCCESSFUL food companies, however, possess their own research departments, where results are under their own control, publication is optional, and there should be no question of ownership of patents, provided that proper contracts are made with researchers. Many of them employ every form of research activity in addition to their research departments. And at least three corporation presidents are known to be so enthusiastic about the development of new ideas that they carry on surreptitious experiments in the kitchens of their own palatial residences.

JUST as there are technical research agencies of the various kinds here enumerated, there also are equivalent market research agencies. Here again much valuable knowledge may be obtained if one knows where to get it. The primary source of all market investigation is the reports of the Bureau of the Census. In addition to the "free" information are the business departments of many publishing companies, which co-operate with the bona-fide prospects. When a concern needs the marketing equivalent of a consulting chemist it can call on the professional marketing counselor or sales counselor, who, like the chemist, works on a fee or retainer basis. The business schools of certain universities also undertake market studies for manufacturing and selling concerns.

MANY advertising agencies are equipped to counsel with manufacturers on selling problems and market research, and although this form of research does not, perforce, lead to patentable knowledge, it does develop very valuable information that is exclusively for the use of the manufacturer if he chooses to use it.

MANUFACTURING concerns with highly developed organizations have their own commercial research staffs, just as they also have their own technical research departments. The advantage of ownership is as obvious here as in technical matters.

A DISTINCT obligation rests upon management to understand technical research. Industrial research is not just another department. It is a most important function of business that sometimes goes wrong because of a lack of this understanding. The one man who is qualified to discuss this subject from all angles without arousing animosities is one who has been a research man, a director of research, and then president of a company employing research on a large scale. Such a man knows the subject from the employer's as well as from the employee's standpoint. Accordingly, Harden F. Taylor, president of the Atlantic Coast Fisheries Company, has explained the relationship of research to the business in the following pages.

GENERAL FOODS CORPORATION has fifteen research laboratories under the supervision of Lewis W. Waters, vice-president in charge of research and development. Here is one of the most successful concerns in the whole field of food manufacture and it believes in research. Mr. Waters has told how his company develops ideas into capital assets through careful direction based on the needs of the company.

ON ACCOUNT of the acuteness of the merchandising problems of today, it is as easy to dissipate corporation earnings through wasteful marketing methods as through wasteful manufacturing methods. The problem calls for research or investigation of a type other than scientific research, for in analyzing markets one is dealing with economics and human behavior rather than the physical laws of the universe. Prof. C. I. Gragg, of the Harvard Graduate School of Business Administration, has told how to learn in advance of the probable sales of a product.

AND THEN there is the matter of raw materials for the food industries, most of which come from living things. When raw materials are of vegetable origin the industry frequently grows its own. Prof. Walter A. Huelsen, of the University of Illinois, a horticulturist who has done much for the canning industry in lowering costs and securing better quality raw materials, has described how industry can profit by agricultural research.

THE IMPORTANCE of agricultural research will be realized when it is recalled that the original proposal for an international conference on sugar which recently closed in Brussels came from Cuban, not Javan, interests. Yet very few have asked themselves, Why did Cuba have greater distress than Java? It will be remembered that for a long time during the preliminary conference at Amsterdam the Dutch were adamant in their refusals to agree with Cuba on an international program of curtailment. They did not need to, for the Java mills could produce raw or refined sugar at a profit when nearly all the rest of the world was selling at a loss. The reason for this advantage is found largely in research.

NEAR Surabaya, Java, is the town of Pasoeroean, at which is located the Proefstation, where sugar cane known as the P.O.J. varieties (Proefstation Oost Java) were developed and tested. These investigations have placed Java in a dominant technical position in the world sugar market. The matter of prices and costs of production did not worry the Dutch nearly as much as it did the other nations, for the Dutch had already paid the price for knowledge some time ago. It is a lesson that any industry should study carefully.

When You Decide to

GO IN FOR RESEARCH

By HARDEN F. TAYLOR
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Problems will confront the proprietor who wishes to institute a policy of research in his business, and troubles will come to the research man who is working for a good business man who does not understand the ways of research, which arise from failure to understand each other or the method by which successful research is accomplished.

IT IS the purpose here to discuss some of the problems that confront the proprietor who wishes to institute a policy of research in his business, and the troubles of the research man who is working for a good business man who does not understand the ways of research. In the larger corporations, these matters give little trouble, for the research department is highly organized under the management of a research director who often is an officer or director of the company, or both. In smaller companies, elaborate organizations are impossible; the president or general manager of the company hires a man, provides him with as much money as he can afford for the purpose, and undertakes to manage him and guide the work in what he thinks is the proper direction. Under such circumstances the proprietor may have scant understanding of what research is or how it proceeds to achieve desirable results; accustomed to judging salesmen, accountants, office, traffic, and plant managers, he attempts to judge his research man by similar standards and to use similar methods to get results. What he may actually do is to make results impossible, for the good research man often is a curious animal, unresponsive to the tried methods that work with other employees.

It is indeed a difficult thing for a proprietor of a small business and his research man to reconcile their points of view and to work harmoniously to the common good. The difficulties arise almost entirely from failure of each to understand the other. Let us examine these two points of view in more detail.

For the purpose of this discussion we must know what we mean by research, for many dissimilar activities bear the name. If goods are not selling as we think they should, we may send a man into the field to conduct market research. He goes behind the counter of a grocery store with pad and pencil and notes what customers call for, and their comments. He sends mimeographed questionnaires to a thousand housewives and makes a number of house-to-house calls. He selects stores in different classes of neighborhoods and determines differences in sales results. These activities are often called market research. It is research of a kind, yes, and has some of the characteristics of the laboratory variety.

This activity is really the systematic gathering of information to be used as a guide to better volume of sales. It may result in a change in the product, package, or label. There is nothing whatever wrong with this useful procedure which has helped many a business to greater prosperity, nor is there anything snobbish in those who seek to call it by some other name than research, to avoid confusion with the scientific variety which moves in a different way. Let us see how error can arise from this confusion of names.

The proprietor, having found that he can successfully direct research in sales and get gratifying results, decides to undertake more elaborate research in the manufacture and improvement of his product, to equip a laboratory, get a research chemist or bacteriologist, and direct him in the same way that he directed his market research man. He hires his man, perhaps by some accidental method, and judges him by the usual standards. He sets out to plan his research man's work, directs him to get a can opener, open cans, smell, look, taste, and serve test meals for comparison of products, keep records, summarize results, make frequent reports of progress, and draw conclusions. His research man may suggest something more: determination of free fatty acids, sugar content, nitrogen, ash, and other things. Improved recipes may be formulated for better products. Here again, useful information may be obtained, yet this is not what scientists prefer to call research, but rather a species of cookery that often passes for research.

As long as the proprietor attempts research along these lines, directing or semi-directing it himself, he invariably runs smack into empiricism, which is the lowest, most expensive, and least productive form of research activity. Empiricism is the trial-and-error method of obtaining knowledge. You try all sorts of combinations of what you are studying, and select the one that appears to work best. It is the way one learns by experience, somewhat systematized and accelerated; it achieves progress, but usually by small steps and with the simpler problems. Few outstanding accomplishments result from this procedure. It often happens that so many thousand things could be tried that it is hopeless to try all of them. In such a case none is tried, or a few are selected at random.

An instance of empiricism and its shortcomings was

afforded by a test trial of a fish-meal plant. The machine had been assembled by the erecting engineer. On the first run the machine stalled, gears were stripped, shafts bent, and motor overheated. The fish waste, in the course of drying, had reached a very sticky consistency and was so tough that the strength of the machine was inadequate to handle it. The erecting engineer appeared one morning with two packages of baking soda to put in the fish waste. When asked just why he had chosen this particular chemical compound from the hundreds of thousands of possible ones, he was unable to give a reason. He was just trying *something*, and of course what he selected was from the limited number of things he happened to know about. Proceeding in this way he might have had one chance in a million of solving his problem by stumbling on the solution without knowing why it was a solution. The fish-meal problem was solved, however, by a scientific study which resulted in a correct diagnosis of the trouble and brought forth the obvious remedy—obvious to the man who made the study and understood the problem in detail, but not obvious to anybody else. The diagnosis involved and depended upon a knowledge of the laws of vapors, relation of pressure to boiling points, effect of the mineral substances in fish on this relationship, and many other laws of chemistry and physics.

It is obvious that the layman proprietor could not direct the solution of such a problem; not that he lacks the intelligence but because he lacks the background of specialized knowledge that is necessary to solve it. The credit and collections manager of the company may resort to the use of trade acceptances to assure the payment for goods; the chemist could not be expected to protect the company's interests in such matters, not because he lacks the intelligence to do so but because he knows nothing about trade acceptances. But, possessed of a broad knowledge of the laws, and the great array of facts, of natural science, the chemist, if he is a good one, can see many possibilities of immense value that are utterly invisible to the business man who lacks this special knowledge. He can devise new processes and new products, improve the technic, and save money; but there is no possibility that a proprietor, without the apperceptive basis of scientific knowledge, can direct his work.

From all of this we can reach certain important conclusions about the research man in the industrial scheme of things. Pure scientific research is being conducted in the government laboratories, universities, and endowed institutions all over the world, by thousands of scientists. They are not primarily concerned with profits or even the usefulness of the results of their work. They are discovering what the world is made of, what are the properties of various kinds of matter, how forces act—the relationships and inter-relationships of matter and energy. Their results are published in the many scientific journals, and are accumulated in libraries as the growing scientific heritage of man. This is pure research.

Applied research is the use of this body of pure scientific knowledge for practical purposes: new products, better processes, lower costs, and the like. It is the business of the industrial researcher to prepare himself in college with the fundamentals of pure scientific knowledge, to keep up continually with current advance in this knowledge, and to apply it to the special problems of the industry he has chosen for his life work.

Control of operations by laboratory methods is often mistaken for research. If an operation, to produce the best results, must be frequently sampled and the product analyzed, it may be necessary to use apparatus that is often seen in research laboratories. The presence and use of laboratory apparatus does not make routine control work into research. Poets and bookkeepers both use pens and ink, but the bookkeeper is not necessarily a poet; neither is the control chemist a research man merely because he uses analytical balances, burettes, and microscopes. If results of research are to be expected, it is generally advisable not to mix research and control; routine work may often be done more cheaply by outside commercial laboratories, or certainly by control or routine men, without disturbing research.

If the proprietor wishes to take up research seriously, he must proceed in accordance with these principles. A good man must first be found for the research directorship. First of all, this man must be thoroughly prepared in the fundamentals of science generally and in the special laws of his own field. He must be a habitual and omnivorous reader of scientific books and journals. Such reading keeps him abreast of scientific progress, provides him with new and stimulating ideas, and keeps up his enthusiasm in his work. When he loses this habit, as many researchers do, his usefulness declines. He must be a man of original and creative mind. This quality is a gem and, like other gems, is rare and hard to find, but when found should be preserved. In addition to these fundamental qualifications, he should be a man of good human attributes, for upon him is likely to fall the duty of directing other researchers if his department grows.

There is no sure rule for finding the man. The

possession of a degree from the biggest or most famous university is no guarantee. Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, from his long experience, says that, for young and inexperienced men, the personal recommendation of the professors in the university who had the applicant under their tutelage is the most dependable indication, but even this is not sure. Of course, for older men, capacity, demonstrated by experience is one of the best signs, but also not sure.

Why are not these sure signs of a good man? Because the circumstances under which a man works have everything to do with his performance. Under the benevolent guidance of a professor and the stimulating surroundings of a university a man may show extraordinary capacity; but when thrown among tough operators in a factory, unappreciative and perhaps jealous plant foremen and salesmen, and driven by supervising business men, his ideals, enthusiasm, and productiveness may be destroyed. Therefore the job is not finished when the man is found. Circumstances must be provided in which his maximum usefulness will manifest itself.

Above all, it must be remembered that the duty of the research man is to create and develop ideas. This is a function of the mind. A harried and threatened mind does not generate ideas. Threats and fear are totally useless weapons for driving a research man to produce results. A contented and enthusiastic mind is the soil in which genius grows. Attempts to drive a research man prevents him from producing any results, for, after all, he has to ponder his subject and wait for the ideas to come, and they take their time about coming. If, under the most favorable circumstances, the researcher fails to produce efforts to drive him are useless.

He must be taken into the fullest confidence of the business. He must be given opportunity to know the business he is working for, and his usefulness will be limited if he does not know it. His results must be practical; if he does not know the business itself, he cannot know how to fit his work to it. Therefore, instead of withholding from the researcher the "private" information of costs, profits, losses, and other intimate facts of the business, the proprietor should insist that the researcher be taught the business as fully as possible.

Involved in this statement are some extremely important considerations that are easily overlooked. A certain natural order guides the march of industrial progress in a definite sequence of events which cannot be reversed. Flying machines were attempted in classic times by Daedalus and Icarus, and have been attempted throughout the ages; all failures until the proper time for success had arrived. When that time came, flying machines arrived quickly by the efforts of many people almost at the same time: Langley, the Wrights, Curtiss, Bleriot. The airplane could not come into being until the internal-explosion engine, volatile fuel, and light alloys were available. The internal-explosion engine had to await the growth of electrical science for ignition to be developed to the stage of magnetos, induction coils, and storage batteries, on high-speed-bearing metals, and on many other things. Fuel had to await the development of petroleum technology and the refinements of oil chemistry; light alloys could not arrive until electrolysis made metallic aluminum possible. Rubber was discovered by Columbus on his second voyage; rubber technology was advanced by degrees. Goodyear invented vulcanization and Dunlop the pneumatic tire which eventually contributed immensely to make the airplane possible. Each of these discoveries depended upon antecedent discoveries, without which they themselves could not have been made. The final resulting airplane came to fruition at its natural time, and in its proper place in the sequence of events; it could not possibly come at any other time.

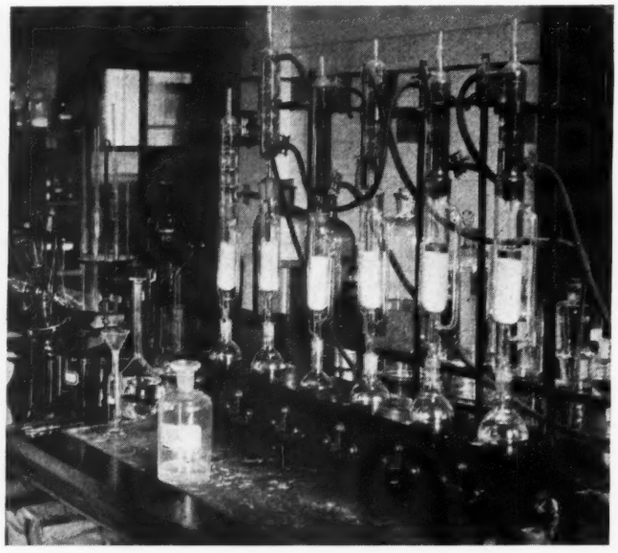
This natural, irreversible unfolding of the flower of progress is true of every industry. The intelligent and broadly informed manager will keep an eye on it, to know what is next in order to be done, for the next thing to be done comes easily and naturally. Things attempted out of turn are failures. The duty of determining what is next falls especially on the research man; he must forecast the trend of the business which employs him, for completion of an important piece of research work often takes years; the need for it must be seen in advance and the work undertaken, so that when results are needed they will be ready. The research man cannot possibly perform this service unless he is broadly cognizant of his company's business. These qualifications plainly call for a man big enough to be eventually an officer or director of the company, or both.

If the research man is not taken into the confidence of the business, so that he can see and understand this order of progress, and be actively at work to promote it, the natural consequence is that he works at trifles—the little things in the business that he sees around him in the plant, the only things he is permitted to see—and the proprietor is disappointed with his man even if he does not feel that he is disillusioned about research generally. Perhaps he throws it out altogether. Research men are individualists—in a sense artists—who work in their own peculiar ways. Efforts to make them work according to rules of procedure or to follow the specific ideas of others merely muddy their perspectives.

But if the proprietor discusses with his research man, on friendly terms, the problems and possibilities of the

business, he will not only get new and scientific views of his own business but he will put into his research man's mind the pieces of which great thoughts are made, the ideas which, when combined with those other bits of knowledge obtained from scientific literature, become creative impulses. If the research man cannot receive this confidence without inflation of his ego and without becoming obnoxious to his associates, he is not big enough for his job.

To tell the research man how to do the work for which he has been trained is not our purpose here, but rather to discuss some of the things that may prevent him from doing it.



The first thing the research man needs is the confidence of his employer and his associates — the plant manager, foremen, salesmen, and operators. With this confidence, he can accomplish much; without it he is discouraged and defeated. The research man cannot expect this confidence to be bestowed on him as a matter of course, or because he has a degree or two from a university. Indeed, he is more likely to be looked upon by the general run of employees as the college man with a lot of theories but no practical knowledge, who has a soft job at good pay because he knows a few big words. It is utterly futile to swear at this attitude; it is the natural reaction of men everywhere who have worked long and hard to get the jobs they have, and who do know their jobs by actual experience.

There is no better or more practical philosophy for the research man than to blame himself for failure for any cause whatever, including even the narrow-mindedness, jealousy, selfishness, and prejudice of others. For these are some of the factors that exist in any organization and must be taken into consideration in producing a result, often as important as the chemical reaction involved, design of apparatus, or technique of operation. Human factors are controllable, or can be allowed for, quite as well as temperature. The wise researcher will take into consideration every factor; if he misjudges or misunderstands the human factors he makes as serious a mistake as if he erred in solving an equation, and is himself as much to blame for the one mistake as for the other.

Confidence of employers and associates is won by two equally important elements: ability to understand others and to make oneself understood; and the production of useful results. We shall write no homily here on the virtues that make one liked: tact and kindliness. But something must be said about the researcher making himself understood. The business man and plant operator are not expected to know the professional jargon or shorthand of scientists. They speak and understand the ordinary English language. In this language the researcher must speak to employer, in selling his wares, and the scientist must sell the product of his labor quite as much as anybody else does. The use of scientific terms for the purpose of making an impression is likely to have an effect quite opposite to what is intended. If they must be used, and are clearly and tactfully explained, it will be found that everybody likes to learn new things and new tricks, and to appropriate them for himself. But for purposes of bombast, they are in bad taste and dangerous. The art of writing or telling about scientific subjects in clear, simple language is a great asset to the individual researcher, indispensable in dealings with the chief and co-workers in the plant.

The business man and the research man may judge a given accomplishment by quite different standards. I have on a few occasions puzzled for days or weeks on the technical aspect of some problem, and finally triumphed with a solution, of which, as an ingenious scientific accomplishment, I felt I had reason to be proud, and wanted to tell somebody about it. The chief, to my dismay, showed no interest whatever in it. But when I made some improvement in, say, a package or other trifle, about which I secretly felt a bit scornful as involving no challenge to scientific ability, the chief was profuse in his congratulations. In the one case, the employer had no way of knowing whether my little scientific triumph was new, or difficult, or clever, and anyway, even if it were all of these, it had no particular significance to the business. But the improved package meant lower cost, or better sales, or more effective competition, and these things he did not fail to appreciate abundantly. His failure to discriminate between the simple and the difficult, between the obvious and the recondite, is sometimes disconcerting but, nevertheless, natural; the research man could as easily fail to perceive genius if the proprietor should conceive an equally novel and ingenious method of financing or selling.

The art of putting oneself in the position of the business employer and seeing things from his point of view is not only desirable but essential. One cannot do this successfully without knowing something about business in general, and the particular business for which one is employed to conduct research, such as the economic history of the industry, the sources and characteristics of raw materials, their abundance and cost; the allocation of manufacturing costs to direct labor, depreciation, upkeep, obsolescence, and other overhead; selling, advertising and distribution, credits, collections, fluctuations in demand, trends of preferences by the buying public, methods of competitors, trend of business. The reasons for this business study by the research man have already been mentioned in the first part of this paper. The industrial researcher's work is to gather useful facts and theories from the ever-increasing body of scientific knowledge and to supply them to the needs of the business that employs him. To do this he must know both the science and the business. The researcher may properly regard himself as the advance guard of the business, foreseeing and preparing for the next steps of progress that are to be taken. To be most effective he should be

working today on major projects which are to be the new business activities one, two, or three years hence, remembering the natural order in which industry develops. Wasting time and effort on trifling improvements and inventions is the natural consequence of failure to comprehend the business broadly.

The other factor in winning confidence is the production of useful results. However likable and persuasive he may be, the researcher is measured by his works. Ideas must be conceived, criticized, checked, and tested, and then carried through the experimental and development stages into successful operation. Many men are good at one or another of these functions and in larger institutions men specialize in one or another of them. The brilliant man, who is fortunate enough to bubble over with ideas all the time, may easily fail to carry out any of them, because, in the course of working out one idea, he gets another new and more fascinating one. The old one is beginning to be troublesome and stale; it is allowed to drag along, and is finally dropped in favor of the new idea, which eventually goes the same way, and few ideas or none are ever carried out to completion. The result is the same as if no ideas had been conceived.

On the other hand, some men are not generators of frequent and brilliant ideas, but are careful, patient, accurate, and persistent in carrying projects through to completion. It is a mere platitude to say that one idea completed and put to work is better than any number, however brilliant, not worked out. This paper is no place to discuss the old question as to whether imaginativeness or creativeness is an inborn talent. The present writer has always believed that it is merely a mental habit, that can be cultivated, of fitting together, like the blocks of a jig-saw puzzle, the concepts that are obtained from reading scientific and technical literature, the bits of knowledge that come from observations in the plant or laboratory, or from stimulating conversations with other people. If one's mind is engaged during all otherwise idle moments, in fitting these concepts and bits of information into all possible combinations, new and often valuable ideas or inventions are hatched with delightful ease. Such ideas are not generated in a mind that is too lazy to cogitate, or that is preoccupied with the daily trifles of life. The mind can be disciplined or driven to this effort until it works habitually and automatically to conceive and invent. Lack of an inherited talent is no excuse for failure. The man who does not acquire these mental habits may blame his poor heritage, but he is likely to spend his life working under the direction of some man who has acquired them.

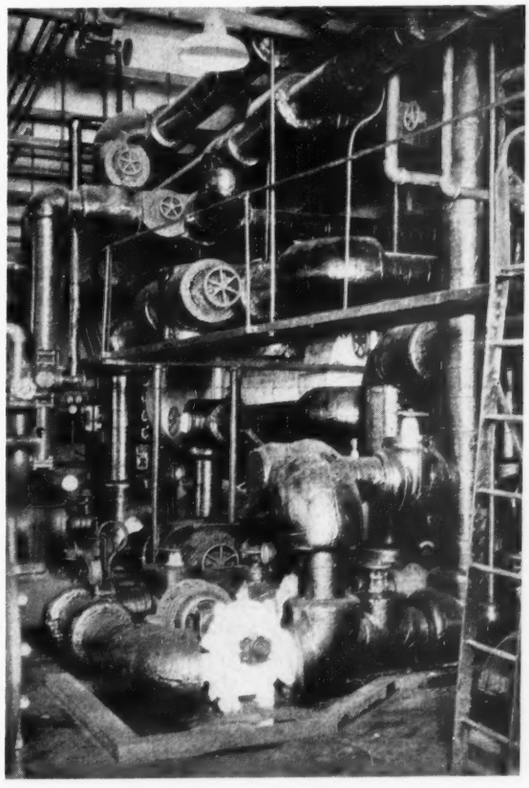
From all of these considerations, it is clear that a certain self-discipline can do a great deal in enhancing the successful conception of ideas and carrying them out as research projects. After an idea has been conceived and cast as a possible project to be undertaken, it is always profitable to subject it to systematic consideration, according to some such scheme as this:

1. Is the project of really worth-while importance, considering the other things that could be done with the same time and resources? Is it of major, or only minor, importance to the company? Is it something that clearly fits into the company's policies and is it the next major step of progress if it is successfully worked out?

2. If it is worth while, what are the prospects of success in its working out? Does it withstand detailed scientific analysis from the theoretical standpoint? Much experimental work results from ignorance of the established scientific laws. It is easier to look up these laws than to rediscover them experimentally, and is much less expensive. Indeed, aided by adequate knowledge of the laws of chemistry and physics, and by reference works of data, one can do much research work with no apparatus.

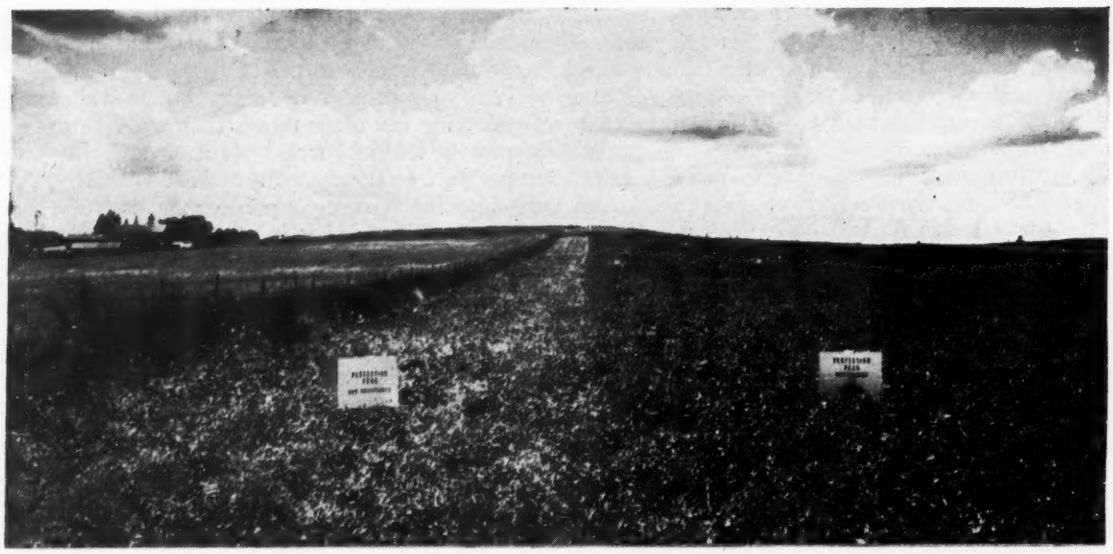
3. Has it been done before? It is, of course, exceedingly unsafe for a man to assume that, since he does not know of a thing and had not thought of it before, nobody else ever thought of it. The probability is always in favor of the assumption that the idea is old, as one finds after a little experience with patents and the searching of scientific literature. It is easy to waste the company's resources developing old and discarded ideas, or something that has already been patented. The time to search patents and previous literature on the subject is before actual research is begun, and not after it is finished.

4. Are resources of time, money, men, and apparatus available to carry out the project to successful completion? Of course, one cannot always foresee what direction a project will take or everything that will be required, but it can be foreseen frequently that a project is too big for the resources available, or too speculative and expensive to be undertaken. Under such circumstances, the researcher may properly disclose the ideas and tentative plan to his employer, with a full statement of the probabilities, so that the employer, with a view of his current financial position, may decide whether or not it is wise to undertake it.



After a proposed project is measured by some standards such as these, and undertaken, only one of two conclusions is a reasonable expectation: successful working or definite failure. Certainly abandonment without conclusion is a mere waste of effort.

If the research man lives up to all of these requirements, he is a good one. Research, however, is subject to the individuality of the man, for research men are, or should be, thinkers who do not conform to rules. But even marked individuality does not enable a man to violate the laws of nature, escape the penalties of sloppy and inaccurate thinking, mental laziness, or inability to tell his chief what he knows, in understandable language.



Inoculated peas on the right, when compared with peas on the left, which were not inoculated, illustrate how science is improving yields of raw materials for the canner

Research in

RAW MATERIAL PRODUCTION

Helps Canners' Profits

By W. A. HUELSEN
University of Illinois Agricultural Experiment Station
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ANYBODY who is at all interested in the past history of the canning industry cannot fail to be impressed by the fact that from the time of Appert the great strides forward have come largely as the result of experimental genius. Since technical processes are now enormously complicated when compared with methods in use twenty years ago, it is obvious that future progress will depend largely upon the skill of the laboratory worker.

Unfortunately, many canners do not seem to be aware of the important rôle that research has assumed in the modern industrial world. Many of them honestly believe that research is a luxury and not as indispensable as enthusiasts state. However, there is developing a remarkably keen competition between industries in bidding for public favor, and the canning industry must prepare itself to meet, among others, a formidable opponent in the fresh fruit and vegetable industry. This new industry is making extremely rapid progress. It is the product of a truly great volume of research work, practically all of which has been accomplished by means of state and federal appropriations. As a result of this research it may be taken for granted that in the near future fresh fruits and vegetables will become active competitors of canned goods every month in the year. It is equally certain that the canning industry will be obliged to exert every effort, especially in research, in order to continue its expansion without interruption.

Scientific research in the canning industry is primarily of three general types. Engineering research dealing with machinery is the first type; technological research consisting of chemistry, bacteriology, and allied sciences is the second; and agricultural research, the third.

During the Civil War period Congress inaugurated a policy of subsidizing agricultural research and education. This policy has also been adopted by every state in the Union and is now so firmly established that the public accepts it without question. The canning industry has been able to secure the benefits of a certain share of these expenditures for the investigation of its agricultural problems through a vigorous and able representation of its needs. In addition, the industry has succeeded in establishing very cordial relations with the various public institutions devoted to agricultural research and, in some cases, has given experimental work a considerable impetus by means of direct contributions for the study of particular problems.

In general, one may say that the canning industry is alive to the value of agricultural research. However, in spite of this consciousness, it is painfully slow in putting the results to practical use. This is true even in instances where the canners have made direct contributions from their own funds toward the experimental work. One cannot justly blame them for an attitude apparently so

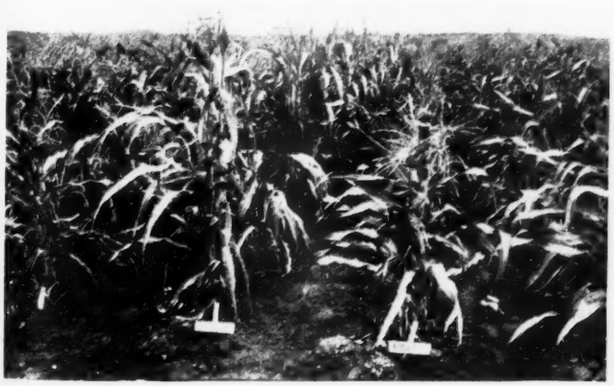
inconsistent with their best interests. The research worker has been trained to deal with facts alone, and no matter how certain he is concerning the reliability of his results in the laboratory, his training forbids him to make sweeping claims. In other words, his experience teaches him that there is often a very long step indeed between the results of carefully controlled experiments and the wide variation in conditions to be met with in general practice. To say the least, the hesitant attitude of the research worker in agriculture does not coincide with the ideas of practical business men who want an answer forthwith to their question, "Will it pay me?"

This difficulty is by no means new and has been recognized for a long time by all institutions engaged in agricultural research. An intermediary has been developed to meet this need, a sort of research salesman, as it were, known as an extension specialist, whose function is to put the results of research into practical use. In one or two states the extension specialists devote some attention to canning crops, but this is not the rule, the canner being obliged to act in that capacity himself. Since neither the canner nor his field men have the time for such duties, it follows that little or no benefit is received from research work of vital importance to them. The obvious remedy is to hire an agricultural specialist.

The principal incentive for hiring a technical agriculturist is to cut costs. This process usually has been associated with factory operations alone and it is not easy to see how it may be applied to agriculture. Nevertheless, this is now about the only place where costs can be materially reduced. Factory operations have been standardized to such an extent that further economies in this direction will seldom justify the expense. Although one sometimes reads articles about applying factory methods to the farm, it is quite obvious that farming practices cannot be standardized in the same way as industrial operations. It is just this lack of standardization which offers the most promising field of attack: namely, a reduction in the cost of raw materials.

It may seem paradoxical but, nevertheless, a number of factories in a given territory will often pay identical contract prices for raw materials and yet some of them actually buy more cheaply than others. The explanation is obvious and easily made. The factory which buys the cheapest is simply getting more for its money, or in other words, higher quality raw materials. The gross price paid per ton is in reality not a true index of the cost of the raw material. The net price paid is based upon the number of cases per ton of raw material which may be packed.

A strain test of Country Gentleman sweet corn in Illinois. Note the differences in type



A test of tomato varieties at a prospective canning factory site in the corn belt. Soils were found badly infected with wilt, as shown by the missing plants belonging to susceptible varieties

Such differences are due chiefly to the type of agricultural executives employed. The field men are mainly responsible, of course. When an efficient field force is supplemented by a technical agriculturist much can be done, but when it is inefficient, the agriculturist can do but little. Unfortunately, it is often true that the field force consists of superannuated farmers or local ne'er-do-wells who are willing to work for a few weeks until the next job turns up. Their only virtue is that their hire is cheap, but are they cheap in the long run? The canner who is very particular about the kind of factory executives he engages, often becomes careless about those he allows to represent him in the field. The field force probably is the more important, since it is axiomatic that the most efficient factory can do but little with poor raw materials. In one case known to me, the canner engaged a technical agriculturist of superior ability and, while this man was becoming oriented, proceeded to revamp the entire field force. In the short space of two years this factory raised its average number of cases per acre from among the lowest in the state to the lead by a fair margin. Needless to say, the dividends received by the stockholders rose proportionally.

Of course, such returns cannot be expected very often. In this case the canner was well located in a region of high fertility, but had not obtained much benefit from it. The technical agriculturist simply showed him how it could be done. As a matter of fact those factories which are located poorly, or in regions of depleted fertility, need an agriculturist all the more. There is the case of a well-known tomato canner located in a region of poor fertility where land sells for $25 per acre. This canner operates now on about 60 per cent of the acreage he usually contracted ten years ago. His present yields are about two and one-half times the former averages. This result was accomplished by a local boy who, after he was graduated in agriculture from the state university, assumed charge of the field operations.

The two canners who have been mentioned are really broad-visioned men who know little about agriculture and, what is more important, realize that they are ignorant. They have unconsciously followed the doctrine of Henry Ford: namely, that a factory is nothing more than a tool for converting raw materials into finished products.

Within the past few years quite a number of canners have added technically trained men to their staffs. These men have proved their worth in almost every case. All of them are men with from four to eight years of university training in addition to a varied practical experience. They should not be confused with the field men or farm managers even though many canners now demand

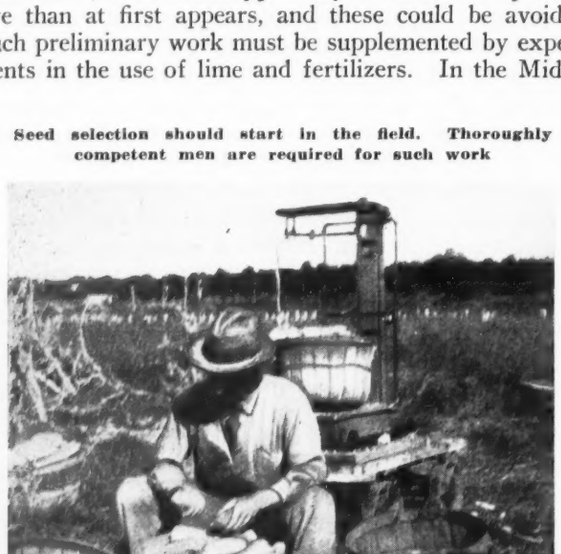
a university training for such positions. The agriculturist works independently of the field force and is responsible only to the president.

The primary function of the specialist is to apply the latest knowledge of agricultural science to local conditions. This is accomplished by keeping in close touch with the research work at the various agricultural experiment stations, which, of course, necessitates considerable travel periodically. Many of the results of important investigations are available to the visitor which will not be published for years to come. For example, new strains of fruits and vegetables may be had for trial long before the investigator even thinks of releasing them for public distribution. The contacts made in this manner often develop into friendships similar to the business friendships every canner makes and they are just as valuable, because the station research man can often give valuable hints when so inclined.

The most effective method of applying the teachings of agricultural science is by means of local experiments. To the research worker they are known as demonstrations, since their principal function is to determine how a number of known facts will react under a variety of conditions. The numerous trials of the Marglobe variety of tomato made by canners a few years ago are the simplest examples of demonstrations. However, demonstrations generally are more complex. In fact, a high degree of skill is required in order to conduct them properly. A canner may want to know whether or not it will pay to sow his pea seed at a thicker or thinner rate of planting. This requires a series of demonstrations which scarcely fall short of being true experiments, since a large number of trials must be run on different soil types and under a variety of farming conditions.

A crop and soil survey also is needed in order to determine the potential yields which may be expected from different local soil types farmed under various crop rotations. It may be found that certain farming practices are deleterious to succeeding canning crops. On the other hand, certain soil types may be found less productive than at first appears, and these could be avoided. Such preliminary work must be supplemented by experiments in the use of lime and fertilizers. In the Middle West, canners' experiments have in some cases shown that rather astonishing increases in the yields of sweet corn, peas, and tomatoes occur when fertilizers are used properly.

Seed selection should start in the field. Thoroughly competent men are required for such work



The necessity for reliable seed supplies is the topic of perennial discussion at canners' meetings, but nothing is done about it except in a few instances. In the case of such crops as pumpkins, sweet corn, sweet potatoes, and cucumbers, it is often essential for the canner to grow his own seed supplies. The knowledge of plant genetics required for selecting and maintaining good strains of seed can be supplied only by a trained specialist.

In helping to outline a general agricultural policy, the services of a trained agriculturist are as indispensable as those of a lawyer when a legal question arises. In the case of a company wishing to expand, would it be more profitable to extend the acreage or would it pay to intensify on the present acreage in order to increase yields? If a new factory is to be located, nothing is more essential than to know the potential crop yields of the new territory. Many factories are built because the local Chamber of Commerce can promise a little cheaper labor, a half cent lower rate on power, or a free building site, as compared with another community.

Such inducements should not have a moment's consideration, however, unless it is known that the yields of the canning crop will be profitable for both the farmer and the canner. The trained man in the canner's employ can, by means of suitable test plots, determine very accurately the desirability of any new territory. This information should, if favorable, determine the size of the factory and the acreage required.

The trained agriculturist is invaluable also in maintaining cordial relations with the growers. The latter are not slow to recognize real training and ability. Where they would ignore the advice of a field man they might freely co-operate with the better trained specialist because of their greater respect for his knowledge. In some cases ill-advised changes in varieties, methods of grading, systems of payment, and the like, which excite hostility on the part of the growers, could be avoided if the canner had the proper advice. The good will of the growers is an invaluable asset and forms just as much a part of the canner's working capital as his brand names and customers' good will. To imperil the cordial relations with the grower is to affect the profits. It should be remembered that the grower can almost always get along without the canner, but the canner cannot exist without the grower.

The whole question of revising agricultural policies is being given serious consideration by progressive canners both large and small. Most of them realize that research work of great importance to themselves is being done at their state experiment stations, but that it is almost impossible to utilize these results properly. This new attitude is accompanied by an increasing number of requests for trained men to add to their staffs.

Should the canner hesitate about taking action, it will be advisable for him to recall that the success of companies whose meteoric rise has become the talk of the industry is in most cases based on a very sound agricultural policy. How much of their success is due to this phase of their business cannot, of course, be stated precisely. Most likely they themselves do not know. It is obvious, however, that a company can fail because of an unsound agricultural policy, but one never hears of a failure because the field force was overstaffed.

Successful Distribution Depends on

MARKET RESEARCH

By CHARLES I. GRAGG
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MARKET RESEARCH, the process of gathering and presenting in usable form facts not otherwise readily available to marketing executives, provides knowledge which is fundamental to the management of sales, production, and financial operations.

If market research is to be regarded as other than a passing fad, it must have a direct, useful, and necessary relation to the making of executive decisions or, more broadly, to the formulation of marketing policies. Whether all the steps are taken deliberately and consciously, or whether one or more of them are dropped out in the short-cut "hunch" decisions which are still too prevalent, the steps in an executive decision may be summarized thus:

1. Recognizing the existence of a problem.
2. Locating and defining the problem.
3. Gathering adequate facts regarding the *nature* and *causes* of the problem.
4. Interpreting these facts in terms of suggested solutions.
5. Selecting the most suitable solution.
6. Putting the solution into execution.

Now, if an executive already possesses adequate facts on which to define or diagnose the problem, and a further adequate set of facts to use as the basis for his selection of a solution to the problem, no formal research is needed. Every executive possesses a vast array of facts about his operations; it is only when these facts are insufficient that the process of formal research is called on. The basic steps in research can be indicated as follows:

1. Recognizing and clearly defining the problem.
2. Preparing questions or hypotheses as to the exact causes and nature of the problem, which must be known before a sound solution can be reached.
3. Outlining and gathering the facts required to answer these questions.
4. Interpreting the facts thus gathered, in relation to the original problem.

Effective completion of these steps provides a foundation for executive decision regarding the problem.

Within recent years, drastic changes have been taking place in the food-consuming markets, in the types of food products manufactured. It should be noted, of course, that market research deals with this subject in terms of the demand for types of products and not in the terms of chemical, biological, or technological factors; that it deals with the methods of distributing those products; and with the sales and sales-force policies of food manufacturers. To mention but a few examples; there has been a widespread tendency among consumers both to curtail their use of breads and pastries and to purchase in manufactured form a larger and larger proportion of such items. The causes of these tendencies have been, briefly, the growing dissemination of knowledge concerning well-balanced diet and the trend both toward living in apartments with their limited cooking facilities and toward unwillingness or inability on the part of the housewife to give the necessary time to home preparation of foods. In the manufacture of food products, the advances in the art of preserving vegetable, fruit, and meat products have raised new sales problems. In distribution, the rise of the chain store need only be mentioned to bring to mind an array of marketing problems which food manufacturers have been facing. Finally, experiments with missionary salesmen serve to illustrate the perplexities in sales-force organization which have become numerous.

The alert marketing executive watches the various indexes which measure the progress of his policies. In probably a majority of instances, it is from these observations of current results that recognition of significant problems arises. If sales in one market area start to fall off while others go ahead, if returns of a certain item begin to rise abnormally, if sales to large customers drop while sales to small accounts grow, the executive detects the presence of some problem requiring action. But before he can act intelligently he must know the exact nature of the problem, its causes, and their meaning.

For instance, several years ago a manufacturer whose line included more than 150 varieties of food products, packed in cans, bottles, and cartons, found that the results obtained by missionary salesmen calling on retailers showed a declining trend in relation to expenditures for that type of work. The company's brand was advertised nationally and its products at that time were sold chiefly through wholesalers to independent retailers. The company had one force of salesmen to call on wholesalers and a separate force to solicit retailers' orders, to be turned over to wholesalers. The company had acted on the assumption that if 80 per cent of the independent retailers in any community stocked the company's products, the community was adequately covered, but that distribution in less than 50 per cent of the number of stores was unsatisfactory. When it was observed that in several communities the number of stores carrying the company's line was falling much below 80 per cent, no adequate explanation was readily available, and a representative of the company was asked to obtain the necessary facts. In one of the communities selected for a test investigation, this representative found that of the 35 retailers, 12 actually distributed 70 per cent of the nationally advertised food products sold in the community.

After further research confirmed these tendencies, the company concluded that it had been misdirecting the efforts of its missionary salesmen, because it had acted on a false assumption as to what constituted satisfactory coverage of a market area. It then concluded that satisfactory coverage was to be gained by concentrating its efforts on the minority of retailers who represented a majority of nationally advertised products.

Another problem in market diagnosis is afforded by the experience of a manufacturer of spices. Prepared mustard constituted about 35 per cent of this manufac-

turer's total sales. Over a period of several years the company has packed its mustard successively in several types of containers: measuring glasses, goblets, sherbet glasses, and preserve jars. This policy, the company believed, made possible the maintenance of a relatively high price to consumers, since the containers were useful after the mustard was consumed. On the whole, however, the company doubted whether the use of novelty containers was an effective means of sales promotion, and it was decided to introduce a new standardized screw-top container. A test sales campaign was conducted in a medium-sized city; consumer advertising and missionary salesmen to call on retailers were important elements in the campaign. The results were unsatisfactory, but the company did not know to what cause to attribute this lack of success. The possible causes were thought to be: poor quality of the mustard itself, too high a retail price, competition of other brands, weak advertising copy.

Market research should by no means be limited, however, to cases in which current policies or experiments fail to yield satisfactory results. One of the important uses of such research, on the contrary, is the discovery of new sales opportunities for established products, of latent demand for new products, and of more economical methods of reaching the consuming markets. When new products or processes are being developed, market research plays an important part in providing accurate estimates of the extent of consumer demand to be served, the best prices to set, the basic sales and advertising appeals to use, and so on. Not long ago, for instance, a prominent fish-products company had the problem of planning production, distribution, and price policies for a new type of prepared fish cakes. This company appropriated $5,000 for a study of consumers' buying and eating habits in different geographic areas. The study was based on an actual sampling campaign, during which consumers were given packages of the new product, and later were interviewed by trained observers instructed to learn each housewife's opinion as to the quality and attractiveness of the product, the suitability of the quantity contained in each package, what would be a fair price to pay, and other factors. After reviewing the results of this study the company was able to formulate its initial policies with far more confidence than would have been possible otherwise.

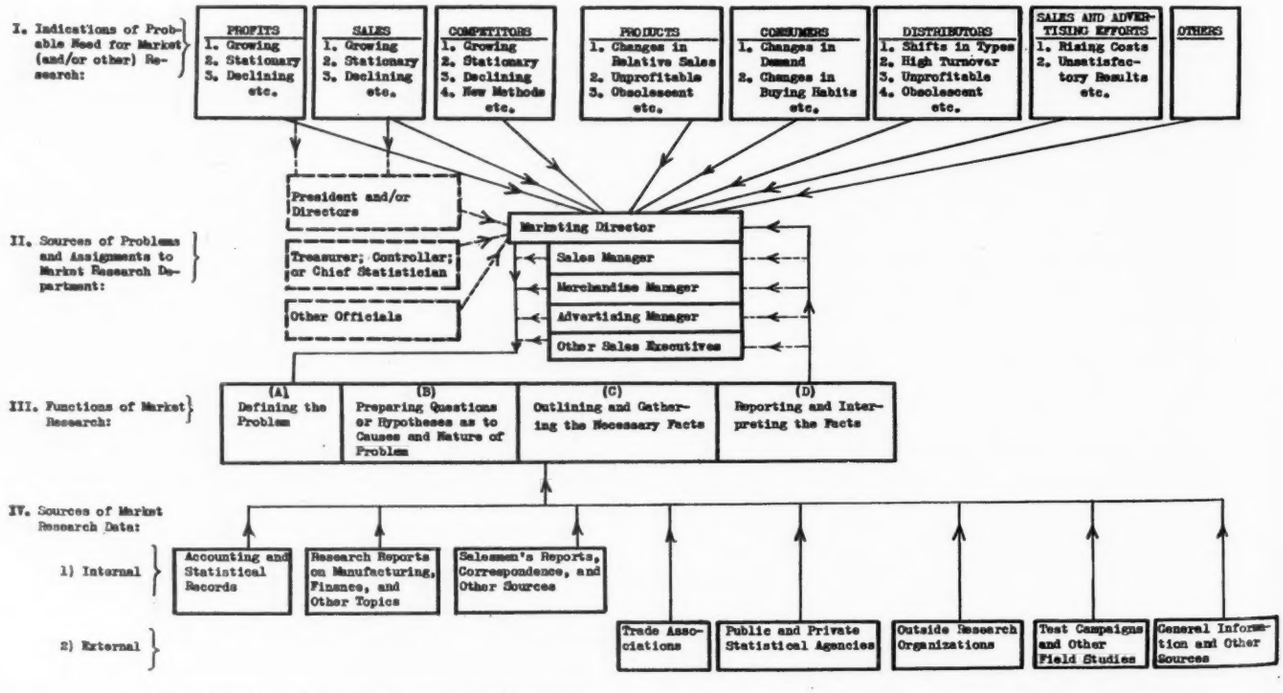
When a company once has decided that it must make formal provision for market research, however, problems arise as to just what subjects should be included in the program, what organization should be set up, and what results should be expected.

To show how market research may be expected to function in a representative manufacturing company, the accompanying chart has been prepared. At the top are shown the various symptoms, such as trends of profits, sales, and competitors, which indicate the existence of marketing problems and opportunities. Next are the several executives who recognize the symptoms, and form at least preliminary definitions of the problems involved. These executives then assign the problems to the market research department, which carries out its research functions. The lowest section of the chart indicates the various sources of information from which the research department may secure the facts necessary for a comprehensive report.

In any particular case, factors of personnel, purpose, and existing facilities play a large part in the final determination of lines of research authority.

In any one company, the selection of subjects for market research must be based both on the nature of the problem currently pressing for solution and on the mechanisms already in operation to supply market information. Perhaps it is not too much to say that the continued progress of the food industry in rendering improved services at lower distribution costs will depend in substantial measure on the extent to which the industry makes effective use of its market research facilities.

Relation of market research to the departments and activities of a representative manufacturing company, with an indication of the probable needs for market research



Heavy lines indicate usual channels of market research activities.
Dotted lines indicate optional channels of market research activities.

CONVERTING IDEAS INTO DOLLARS

Controlled Research Brings Profits

By LEWIS W. WATERS
Vice-President in Charge of Research and Development
General Foods Corporation
New York City

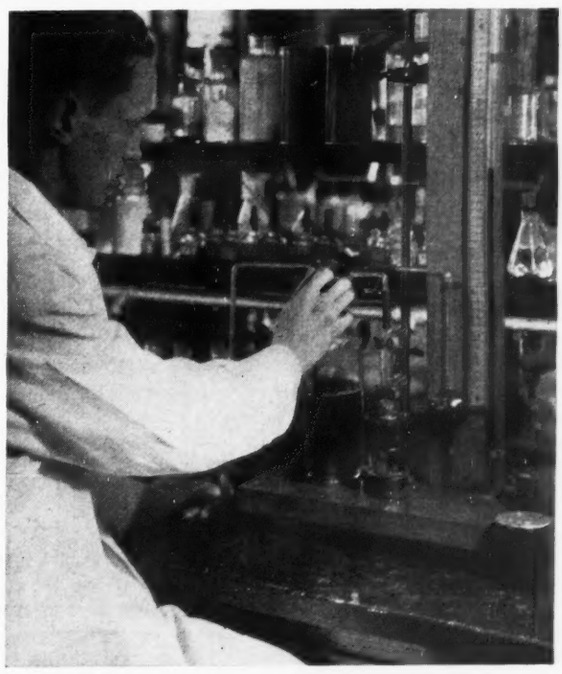
Small-scale plant development of new products or processes helps manufacturers to make their mistakes in a small way and their profits in a big way

MUCH development in the food field has been the result of scientific research which has converted ideas into dollars. Someone has defined research as being concerned with the science of materials and the laws governing their function.

Pure research is a hunt for facts which may or may not find immediate application. It represents carefully planned experiments that yield information without waiting for chance to reveal it. It is building up a storehouse of new knowledge which will be available when needed.

Commercial research is digging out facts because there is a definite need to solve a problem. It is the accumulation of profitable knowledge. When the results of pure or commercial research are made use of in industry, they become development, which is the scientific use of acquired experience.

The first function of the development department is obtaining facts and ideas. We must have something to develop. Good ideas are just as much assets to our company as raw materials, manufacturing equipment, or containers in which our products are distributed. These ideas may originate within our own organization, for we maintain two laboratories devoted primarily to pure research and a dozen others in different parts of the country devoted to applied research and plant control.



In general, each of the applied research laboratories is primarily concerned with some particular branch of the food field, such as baking, gelatin, chocolate products, and the like. However, very often the solution of a problem may require not only pure research but also contributions from several of the plant research laboratories, because of special facilities or previous experience of their respective personnel. Problems already solved on one product may save time and effort by pointing to a solution of another problem. A plant process once perfected is very likely applicable to several other operations with some modification, although the products are entirely different.

In order to get an independent view of our problems we maintain research fellowships at many leading universities, here and abroad. If consulting chemists, through exceptional facilities or training, are better equipped to present a quick answer we make use of their services.

Ideas come to us from other departments of our organization, particularly the consumer service, sales, and advertising departments. Our consumer service department is composed of a group of women who possess the technical knowledge of food and the very important viewpoint of the housewife.

New products may very likely be suggested by a salesman who, through practical experience, recognizes the need for them. Finally, the world at large is glad to bring ideas and suggestions to our door, amounting to hundreds in the course of a year.

We welcome ideas from all sources, listen to everybody's story, make investigations, and arrive at reasons why the idea can or cannot be used. The layman often has an advantage over the scientist in not being hampered by theoretical knowledge. He goes ahead and does something that the scientist does not attempt because theoretically it cannot be done.

If a new product is brought to us from any source, complete information is obtained concerning it, together with samples if available. These samples are tested in the consumer service department's kitchen for quality and at one or more plant laboratories for composition. If reports are favorable, a conference and demonstration are held with representatives of the sales, advertising, consumer service, and production departments present.

Few successful food manufacturers today attempt to operate without a staff of trained women. Such women have made marked contributions to the industry and have demonstrated that they can fit into modern business life and still retain their feminine qualities

If merely a suggestion of a new product is received and it involves devising a suitable recipe, the product is born in the consumer service kitchen rather than in the plant laboratory. We have found it saves time to have the formula correct at the start and then adapt production methods to it. Naturally, if the product involves complicated manufacturing processes, the start may be made in the plant, but the work progresses with the assistance and co-operation of the technical women.

After the new product or process is perfected in the laboratory, it is extended to the plant on a small scale, duplicating as nearly as possible full-plant operations. Kinks are ironed out, cost figures are determined, and samples of the manufactured product are available. To make sure that we are still right, a consumer test is conducted by the advertising department involving several hundred typical housewives.

Then comes the preparation of the container and adoption of name, label, recipes, etc., which require the combined brains of sales, advertising, legal, consumer service, purchasing, and production departments. After production starts the product is tried out in test markets, to be sure again that we are handling it correctly. A product or process is intended to be turned over to the production department as a smooth, efficient operation, but we have to be prepared to lend assistance if unforeseen difficulties arise in plant operation. It will be seen that the path of an idea from conception to market is a long one before it is converted into dollars and requires contributions from a great many people. Naturally, we have a large number of ideas always in the works and at various stages in their development.

This brings us to the second function of our development department. The possession of a storehouse or reservoir of ideas and information enables us to practice what we call "organized vision." We strive to chart the course we are to follow and formulate a program of expansion with new and related products, or of new uses for our present line. We do not subscribe to the adage that it is better not to cross a bridge until we get to it, for if the way has been properly prepared through forethought and vision, the crossing probably will be made without ever knowing it existed. At the moment we are concerned not only with 1931 but also with three and five years hence. We should be able to make a reasonably accurate guess as to what is going to happen, and we ought to be able to make certain things happen.

Again, a good development department ought to interpret ideas and technical facts into simple language that any business man can understand. There is no necessity of having a scientific report to a business executive bristle with technical terms unintelligible to a layman. It may sound impressive but it will not yield appropriations. If he must be burdened with a long report, give him a short summary at the beginning covering all the essentials. If this summary is well done he may read the rest of it. There is a vast amount of valuable technical information buried in scientific journals which has never been used commercially because no one has ever interpreted it into business language.

Along with accumulating and interpreting information goes the job of selling ideas, one of the most important functions of development. Salesmanship is necessary and sometimes it takes a long time. Although change is always going on, it is natural for most to resist it.

This article is concerned primarily with the control of research and assumes the proper organization of a development department. It is generally agreed that successful research depends upon good men protected as much as possible from interruptions, too much interference, needless delays, and discouragements. A good research man should have proper training, ambition, the spirit of adventure, imagination, and enthusiasm.

In our experience, a man who is enthusiastic over some problem which may appear to be of minor importance generally achieves more far-reaching results than another who may be only mildly enthusiastic.

This does not mean that competent direction is unnecessary in any good organization. But an executive who works only along lines he personally believes important is building up a one-man department and is failing to use co-operating brains. A scientific worker very often is temperamental and may work best alone. Others gain by contact.

The problems chosen should present no apparently insurmountable difficulties and the products involved should either meet a public need or a demand that can be created by proper sales promotion.

Successful organizations in the food industry today are convinced of the importance of industrial research. They have the faith to provide trained men with proper laboratory facilities. They have the courage necessary to back up the findings of research with development. It is no time to curtail research when business is poor. One does not throw life preservers overboard to lighten a ship. Research is more important in the food industry today than ever before in anticipation of return in dollars in the years to come.

ORGANIZING AND EQUIPPING

For Research

By WILLIAM LOHR
Vice-President, Applied Sugar Laboratories, Inc., New York City

A RESEARCH laboratory, in which materials and their use in industrial processes may be studied, fills a definite need. This laboratory may be an integral part of the manufacturer's organization; it may be maintained on a fellowship or association membership basis; or it may take the form of a specialty laboratory that renders service on a fee basis.

Specialty laboratories offer facilities to the large corporation that has a problem requiring intensive investigation, as well as to the small business that must have its problems studied by experts in the least expensive way.

In planning such a laboratory, decision must be made regarding the field to be covered; whether attention will be centered upon definite processes and the multiplicity of materials affecting those processes or upon definite materials and their relation to the many industries. Such factors determine selection of site, personnel, equipment, and method of financing the laboratory.

After several years of planning, the Applied Sugar Laboratories, Inc., was formed to provide facilities for the solution of problems affecting the use of sugar in the many products where it is a basic raw material. Not only do these laboratories cater to the problems of sugar; they extend their field of usefulness to closely allied products, such as flour, starch, dextrines, and the like. These materials enter so intimately into the field of food processing that provisions have been made for handling investigations on a semi-plant scale, as well as from an advisory and strictly laboratory standpoint. The bacteriological aspects of these materials have been considered along with the chemical and physical, because an increasing number of processes depend upon microbiological activity and because spoilage is very often linked up with the destructive action of micro-organisms.

These laboratories were located in the lower Wall Street district of New York City, where is grouped the bulk of the sugar trade and to which naturally come those who are interested to learn about the use of sugar and its allied products. In this high-rent district the laboratories had to be equipped to give maximum results per unit of floor space used. Also, because these laboratories have been organized to serve as a service station for experiments on a semi-plant scale and to handle research problems, as well as control work, the equipment through necessity was chosen to fill the requirements of the many uses to which it would be put.

This involved choosing correlated equipment that could be used as processing units in a versatile pilot plant devoted to manufacture of products containing carbohydrates. Also equipment that could, if necessary, be utilized as units in a control laboratory in which effect of time, temperature, moisture, and chemical reaction conditions in relation to process operations and shipping or storage could be studied. That is to say, the equipment selected had to be suitable for diversified uses, assembled or grouped to occupy the minimum floor area in a productive manner, to operate under the best possible conditions for control of time, temperature, light, and sanitation, and to be suitable for handling commercial-sized as well as small sample batches.

The pilot plant is really a small factory containing necessary equipment for the manufacture of general types of confections, bakery products, and foods. In addition to this equipment a small chemical control laboratory unit has been installed to check on all processes and products handled in the pilot plant. Construction is of modern design and fixtures are of steel, with maple tops, wherever confectionery and baking products are handled. This construction is replaced by stone wherever chemical tests are made. Equipment consists of a complete manufacturing unit composed of vacuum cookers, open-fire cookers, variable-speed mixers, cooling tables, steam jacketed kettles, with an available steam pressure of 125 lb., a Monel metal cream beater, and the usual auxiliary equipment.

Supplementary to the standard equipment in this pilot plant is a specially built oven in which it is possible to regulate temperature and humidity through an elastic range. It is under automatic control and is adjustable for drying or incubating purposes and for study of stor-

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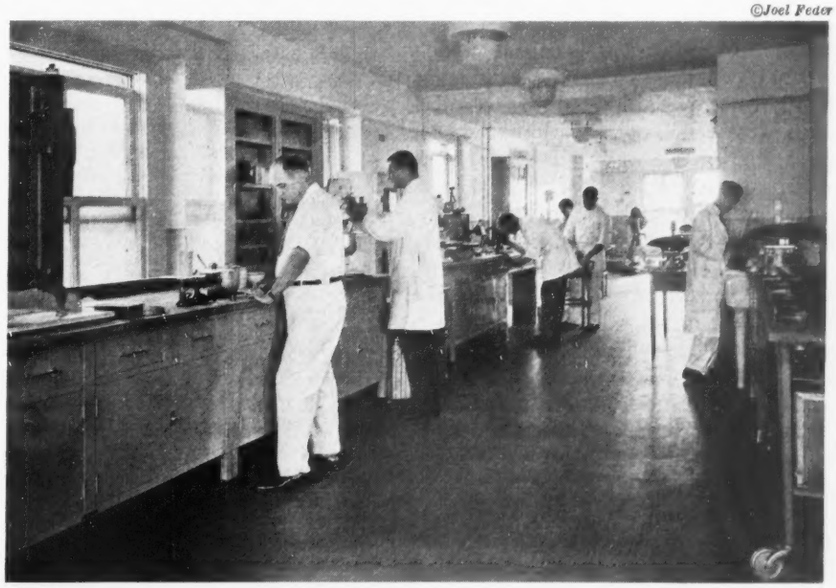


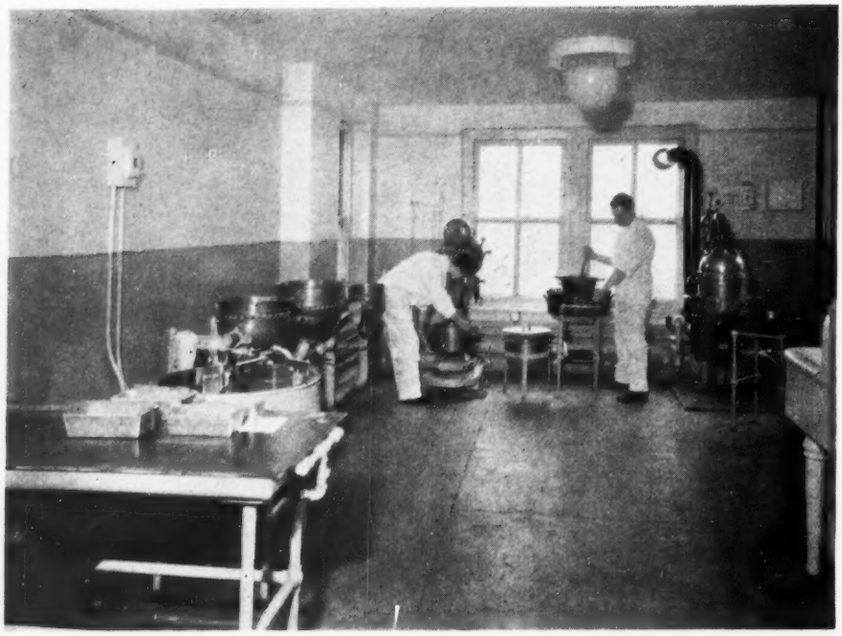


Fig. 2—Equipment in compact candy plant of latest type

age and shipping problems. Uniform circulation of air is guaranteed by the use of a fan capable of moving the inside air at a rate sufficient to produce uniformity, yet not at a high enough rate to blow starch from the boards. In this oven it is possible to stack filled starch-boards just as is common practice in the average confectionery plant. A baking oven, in which temperature and humidity are under automatic control, also has been included. In this oven it is possible to bake either by hearth heat or by the circulation of preheated air, into which the necessary moisture has been introduced.

The research and control laboratories are located on the floor above the service laboratories and have approximately 2,500 sq.ft. of available floor space. Since these laboratories are on the top floor, it has been possible to set in a skylight across the whole front to insure proper lighting at all times. The space is divided into a main research laboratory, an analytical section, a bacteriological section, and the office. The latter is also a private laboratory in which is found equipment for doing detailed microphotometric work as well as other specialized research. In addition, a room has been set aside where constant temperature and humidity are maintained in accordance with the most modern practice in saccharimetric work.

Equipment consists of steel desks along the greater part of the wall space, provided with cold and hot water, gas, electricity, compressed air, vacuum and steam outlets. One of the compact set-ups is a control table which has been designed for rapid and accurate sugar determinations. This unit includes a refractometer, large cooling tank, boiling water bath, and water bath kept at 60 deg. C. by automatic regulation.

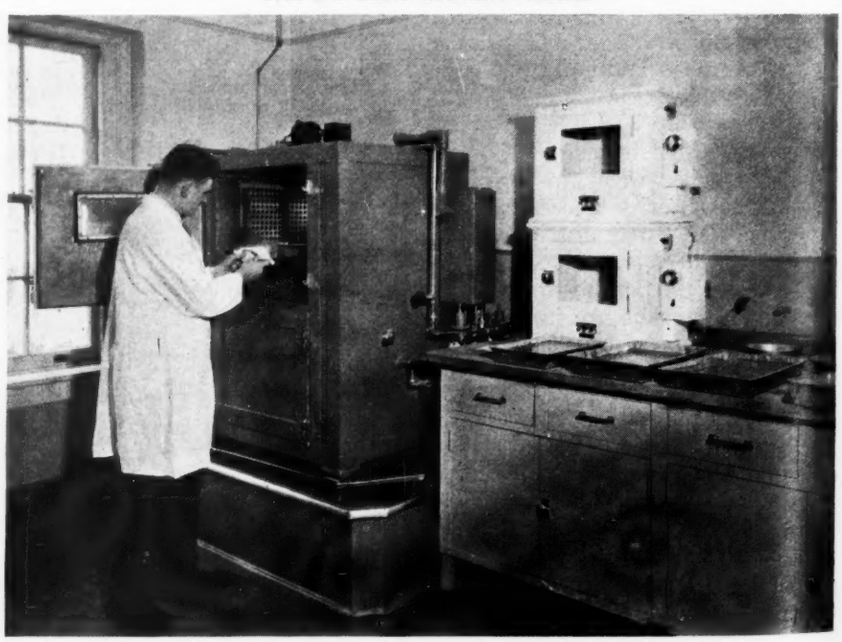
A bacteriological section has been designed for the specific study of the action of bacteria, yeasts, and molds on sugar and allied products. Microbiology is assuming a more important rôle in production, as well as destruction, of products, and it is intended to carry on research which will lead to the improvement of existing microbiological processes, and to study causes of spoilage.

To carry on successful investigations in such a field as that occupied by sugar and kindred materials a staff diversified in training and highly experienced in practice is a necessity. Not only is the operation of the laboratories as a whole a business enterprise; practically every problem investigated is a business activity that must be approached from an economic as well as from a technical or operative viewpoint. For these reasons the active head of such a laboratory organization must be a man of thorough fundamental training in the sciences, must have wide and successful experience in the manufacture and use of confectionery and baking supplies, in directing and handling personnel, and in the manufacture of products in which carbohydrates play an important part, and must have proved business ability.

It is essential that he be assisted by a technical staff of individuals who have had technical and practical experience in the manufacture and use of the various carbohydrates, who are recognized in the sugar, baking, and confectionery industries as men of good judgment, thorough technical and practical training, and successful industrial experience, and who can correlate laboratory data with manufacturing operations to produce interpretative results.

In the case of the Applied Sugar Laboratories, Inc., the managing director is a thoroughly trained industrial chemist, who has had more than twenty years' experience as chief chemist, chemical engineer in charge of development work, and managing executive for indus-

Fig. 3—Electrically heated proofing cabinets and baking oven are under automatic control



trial concerns using sugar and its allied products in various forms and under diverse processing conditions.

The technical staff is composed of men well known to the confectionery and baking trades as practical experts in their line and familiar with the many types of manufacturing problems that are encountered, and of chemists, who, both from training and experience, are fully capable of handling any problem in the manufacture, production and use of sugars and their allied products. One member of the technical staff has done special research work on the rarer sugars and is familiar with the microbiology of sugars and their allied compounds. In addition to these, other chemists are employed, one of whom is a specialist in baking; another is a specialist in sugar; another has had wide experience in state food control; while still another has done special work on electrometric titrations, acidity measurements, and spectophotometric work. All of the staff mentioned are graduate chemists and many have post-graduate degrees. There also is to be found the usual number of assistants, who have had some fundamental training.

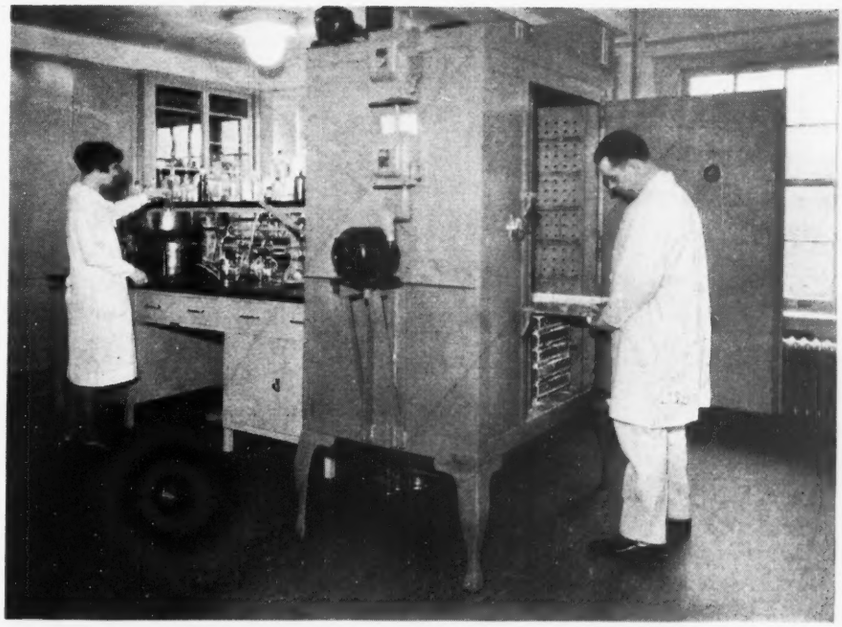


Fig. 4—Operations in pilot plant are under laboratory control. Drying cabinet has sensitive temperature and humidity regulation

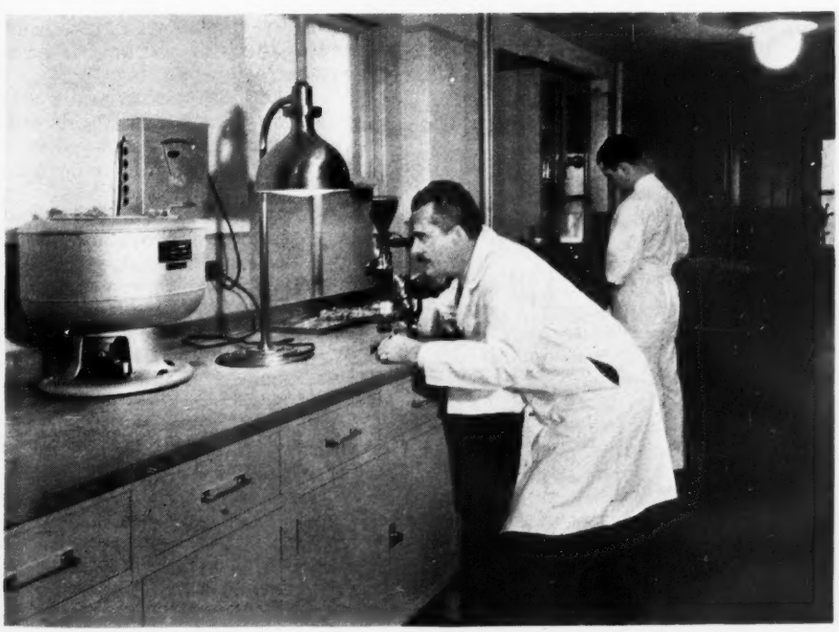
In the practical personnel are found men favorably known in the confectionery and baking fields and who have had 25 to 35 years' experience in these fields. Continual contact with the industries that the laboratories are serving makes them familiar figures whose ability is not questioned. With such a background it is possible for these men to render advisory service which, when combined with laboratory findings of a purely scientific nature, will be of far more value than would be possible to gather from the practical and the scientific groups functioning independently of each other. The thought has always been uppermost in the minds of the organizers of these laboratories that the personnel employed must represent the industries they serve.

Where such a laboratory must be self-supporting, the question of finance also is of major importance. Here business principles must be applied just the same as in the manufacture of products. Of course, a venture of this sort must be financed to start, but after it once begins to function, it must be, at least, self-supporting.

The presence of a laboratory in the modern plant is the rule rather than the exception, but if the subject be considered further, it will be seen that it is not always practical for the manufacturer to establish a laboratory within his own plant that will be able to handle all of his problems. It is not doubted that some of the larger corporations are not only able to support such a venture but are actually doing it. However, there are many that require outside assistance from time to time. Research laboratories such as the Applied Sugar Laboratories do not supplant privately owned laboratories, but augment them by offering an experience and service that is possible for neither the manufacturer of raw materials nor the consumer to obtain in his own organization. This gap has always existed and it is generally necessary that it be bridged by a disinterested laboratory.

Charges for services are based on time spent on a problem, equipment required, and the general overhead, which must be taken into account for any organization. Where it becomes necessary for one of the directors to apply personal time, it is charged for at a rate other than that applied to regular daily problems. In this manner it is possible for the manufacturer, regardless of size, to have work done at a cost which will rarely exceed interest charges on the investment necessary to set up equipment and employ satisfactory personnel.

Fig. 5—Microphotometry is playing an increasingly important rôle in critical examination of food products and supplies



ABSTRACTS OF CURRENT LITERATURE

VITAMIN A IN PLANTS. H. von Euler. V. Demole, P. Karrer and O. Walker. *Helvetica Chimica Acta*, Vol. 13, pp. 1078-83; October, 1930.

To settle the question as to whether or not carotin is the substance responsible for vitamin A potency, tests were made with extracts from corn kernels, marsh marigold blossoms, and the green leaves of spinach, lettuce, beech, stinging nettle, and rye grass. In these tests (growth tests on rats), attention was given to the possible influence of xanthophyll and chlorophyll as accessory growth factors. The results of the experiments clearly show a close parallelism between the carotin content of the extracts and their vitamin A potency. Additional experiments with carotin from carrots showed that carotin readily lose its vitamin potency by exposure to air (autoxidation), and that hydrogenation also destroys its potency.

* * *

SPOILAGE IN HONEY. A. G. Lochhead and Leone Farrell. *Canadian Journal of Research*, Vol. 3, pp. 95-103; August, 1930.

It is now generally recognized that fermentation spoilage of honey is caused by sugar-tolerant yeasts, capable of restraining the growth of the ordinary yeasts. Tests of hive nectar, made throughout the season, indicate that infection with the sugar-tolerant yeasts is constantly present; hence, while strict sanitary precautions during production help to prevent loss by spoilage, they are not alone sufficient. Sodium benzoate, sodium sulphite, and sodium bisulphite are all effective within the permissible concentrations, and these three are the only ones out of the chosen list which seem, from the preliminary results, to be worth further testing on a practical scale. Tables of data and curve charts are shown, together with one plate of photographs of fermentation tests.

* * *

DIALYSIS OF MOLASSES. G. Genin. *L'Industrie Chimique*, Vol. 17, pp. 542-4; August, 1930.

Toward the end of the last century and early in the present century, dialysis was much in favor as a means of purifying beet molasses. It is true that the method involves some loss of sugar by osmosis, but the increased yield due to removal of salts from the molasses more than compensates for the loss by osmosis. Two reasons for waning popularity of dialysis are diminished interest of producers in extraction of sugar from molasses, and inefficiency of the dialytic extraction, due to lack of knowledge of optimum arrangement of the cells. It was customary, in extracting sugar from molasses, to arrange the cells in parallel; that is, the molasses feed tank was connected by a single line to all the cells, and so also was the feed tank for pure solvent. The result is that the liquid to be dialyzed does not come in contact with pure solvent except during its passage through one cell, and the sugar extraction is relatively inefficient. Attention is called to a more recent development in which the cells are arranged in series and the flow of liquid and pure solvent is effected on the counter-current principle. This greatly improves the efficiency of the extraction. It is believed that this method will bring dialysis back into favor for several industrial processes in which, as in sugar extraction from molasses, it had ceased to be popular.

* * *

DECREASE IN INTERIOR QUALITY OF HEN'S EGGS DURING STORAGE AS INDICATED BY THE YOLK. P. F. Sharp and C. K. Powell. *Industrial and Engineering Chemistry*, Vol. 22, p. 908, August, 1930.

The "interior quality" of eggs is usually determined by candling, but experiments indicate that the ratio of the height of the yolk divided by the width, may also serve as an index of quality. The flattening of the yolk and its decreased resistance to breaking are largely attributed to the passage of water from the white into the yolk during storage. The progressive flattening of the yolk and passage of water into the yolk is greatly accelerated by increased temperature of storage.

* * *

BUTTER AND ITS ADULTERATION. A. d'Ambrosio. *Giornale di chemica industriale*, Vol. 12, pp. 394-7; August, 1930.

The composition of genuine butter varies so much with the seasons, the kind and quantity of feed and water given the cows, the length of time before or after parturition, and the state of health of the cows, that it is hardly possible to set up any chemical standard which will certainly distinguish genuine from adulterated butter. Figures are cited, from analyses of known genuine butter from various sources and localities in Italy, to show how natural variations may be sufficient to indicate watering of the milk or adulteration of the butter with margarin, if the tolerances set by government standards are accepted. As a remedy for this situation, it is proposed that the government require all butter substitutes to be denatured in such a way that the butter substitute itself would not suffer in quality or salability, but reliable chemical detection would be possible in case the substitute were used to adulterate genuine butter. As the most practical means of denaturing margarin and the like, it is suggested that 5 per cent of sesame oil should be added, this requirement being made compulsory for all butter substitutes. Without some such expedient, existing legal standards would always permit sale of some butter adulterated with margarin yet meeting the standards, and exclude some genuine butter for lack of conformity.

* * *

SOME OBSERVATIONS ON VITAMINS *A* AND *D* ACTIVATION OF YEAST BY X-RAY AND OTHER RADIATION. L. H. Jorstad. *Proceedings of the Society for Experimental Biology and Medicine*, Vol. 27, p. 930, June, 1930.

The Cooper - Hewitt lamp, quartz light, and x-ray in low voltage cause an activation of vitamin *D* and vitamin *A* in yeast as shown in feeding tests made with rats whose diets were deficient in vitamins *A* and *D*. The period of exposure to the light in each case varies with the type of light used. Depending on experimental conditions, such as intensity of radiation, and distance of material to be activated from source of rays, there is a definite time in which activation reaches its maximum and then becomes less.

* * *

PECTIN CHEMISTRY. Felix Ehrlich. *Cellulosechemie*, Vol. 11, pp. 140-51; July 6, 1930.

It is proposed to give the name "pectic acid" to the substance now commonly called pectin, reserving the name "pectin" for the original unhydrolyzed substance, sometimes called "protopectin." It is significant that pectic acid (using the proposed name) derived from the cell-wall pectin of orange peels and sugar beet roots is the same substance from either source. Chemically, this pectic acid is a dimethoxydiacetyl-arabinogalacto-tetra-galacturonic acid. There is some evidence that enzymes in plant materials cause a certain amount of hydrolysis of pectin in the plant. There is also evidence that the dissolved or colloidal pectic acid present in fruit juices contains, in addition to partially hydrolyzed pectic acid from the original cell-wall pectin, certain amounts of trimethyl or tetramethyl esters of a tetragalacturonic acid. Probably fruit pectins characteristically differ from other pectic acids of plant materials in that their content of these esters is higher. It is believed that the higher methyl esters of galacturonic acid have a very important function in jelly manufac-

ture with the aid of pectic acid. This probably explains inferior jelly consistency in the practical use of pectic acid from orange peels or sugar beet roots, whereas pectic acid from juices of citrus fruits or certain berries gives jellies of better consistency.

* * *

EVAPORATING EXTRACTS. O. Zahn. *Chemische Fabrik, 1930,* pp. 285-6; July 23, 1930.

The Zahn-Elstermann thin-film evaporator and distillation apparatus has been developed to meet the need for a means of evaporating or distilling heat-sensitive liquors or extracts without decomposition, discoloration or undue losses. Most of the losses have been due to the length of time (often an hour or more) during which the material was subjected to the heat of the evaporator. Foaming has also been a prolific source of operating difficulties. In the new thin-film evaporator, the liquid flows through in 2 to 5 minutes (according to the size of the apparatus), passing over the heated surfaces in layers not more than 2 to 3 mm. thick. At the inlet, the liquid flows onto a distributor plate and thence to a rotating ring, which whirls it against the cone-shaped heating surfaces. As it reaches the center of each cone the remaining liquid flows onto another distributor plate, and so to the next heating surface.

BOOK REVIEWS

A COMPILATION OF CULTURE MEDIA FOR THE CULTIVATION OF MICRO-ORGANISMS. By Max Levine and H. W. Schoenlein, Department of Bacteriology, Iowa State College. Published by Williams & Wilkins Company, Baltimore, Md., 1930. 969 pp., 9¼x6½; cloth. Price, $15.

AN ENORMOUS amount of work is concentrated in this voluminous book, which contains about 7,000 different media, condensed in 2,543 recipes for the cultivation of micro-organisms of all kinds, from the strangest soil types feeding on minerals only to the most fastidious parasites which have to have blood or special tissues to live.

The variety of media is surprising even to a bacteriologist. There are 14 different media for milk bacteria, 17 for vinegar bacteria, 71 for the cultivation of yeast. There are media made from bean-pod infusion and from clover blossoms. Media of special interest to the food bacteriologist are included. There also is a list of five different special media for the cultivation of Clost. botulinum; there is Hunters fish infusion broth to study the decomposition of fish; there are media for vitamin studies; and for sauerkraut bacteria, etc., etc.

Th authors have realized that the value of such a reference book lies largely with its index. There are five indices: first, all media are listed by their common name if they have one (35 pp.); then follows an index of all constituents used (23 pp.); next, the media are listed according to their use and application (7 pp.); then comes a page index of the authors; and finally 55 pages of literature references. Despite these 135 pages of indices, they might be more complete. The food bacteriologist is most likely to look for his media in the "use index," and he will find there neither pickles, nor cucumbers, nor sauerkraut, nor cabbage. The media are in the book, but it takes some time before some of them can be located. The term silicate jelly occurs in none of the indices. Further, the "constituents index" contains a long list of references for the use of glucose, and also a list for dextrose, and the two lists do not check.

Aside from this inconvenience, the book is a useful book to any bacteriological laboratory. It is one of those books that will not be used very often, but when it is needed, nothing else can take its place. Such books eventually save an enormous amount of time which stands in no proportion to its price. It will prove of value in any food laboratory where bacteriological research is conducted, and might also suggest improved methods for better control.

OTTO RAHN

* * *

THE MICROBIOLOGY OF STARCH AND SUGARS. By A. C. Thaysen and L. D. Galloway. Published by Oxford University Press, London, 1930. 366 pp., 8¾x5¾; cloth. Price, $8.50.

IN THIS book the authors have given a comprehensive survey of present knowledge on the action of bacteria, yeasts, molds, and their enzymes on carbohydrates. These carbohydrates range from the pentoses through the hexoses, di-, tri-, and tetra-saccharides to starch and including the glucosides, glycogen, and inulin. The text is accompanied with exhaustive references to extant literature.

Of particular interest to the sugar industry are the chapters dealing with the microbiology of sugar cane, sugar beet, and their raw juices, and with the microbiological deterioration of sugar in storage.

For those interested in the constructive aspects of microbiology—that is, in fermentation industries and the production of various organic chemicals by means of micro-organisms—the sections treating of the fermentation of monoses, production of gluconic, saccharic, succinic, fumaric, oxalic, lactic, and citric acids, as well as higher alcohols and acids, will be especially valuable. The processes discussed are dealt with from a theoretical, as well as a practical point of view.

The chapters concerned with cereals and cereal products, bread and baking, sizing materials, and adhesives round out the book in such a manner that it may well be said to fulfill a long-felt want in an admirable way.

JOSEPH F. LEETE.

GOVERNMENT PUBLICATIONS

DOCUMENTS ARE AVAILABLE at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated, pamphlet is free and should be ordered from bureau responsible for its issue.

California Fisheries, by R. H. Fiedler. Bureau of Fisheries, Document 1087; 10 cents.

Wheat Quality, by D. A. Coleman and others. U. S. Department of Agriculture, Technical Bulletin 197; 35 cents. Technical and statistical résumé of milling and baking qualities of wheats from all parts of the world, with characteristic test data.

Alaska Fisheries, by Ward T. Bower. Bureau of Fisheries Document 1086; 25 cents. Statistics for 1929.

Cuban Economic Situation, by Frederick Todd. Bureau of Foreign and Domestic Commerce, Trade Information Bulletin 725; 10 cents.

Co-operative Marketing and Purchasing, by R. H. Elsworth. U. S. Department of Agriculture, Circular 121; 10 cents. Statistical summary, 1920-1930.

Selling Salad Dressing Through Retail Stores. Mimeographed document from Domestic Commerce Division, Bureau of Foreign and Domestic Commerce. One of a series of commodity studies from the Louisville Grocery Survey, including an analysis of container sizes, varieties, and profits.

Rat Control, by James Silver. U. S. Department of Agriculture Farmers' Bulletin 1533; 5 cents. A popular discussion suitable for distribution to plant operatives.

Production Statistics from 1929 Census of Manufactures — Preliminary mimeographed forms for corn syrup, corn sugar, corn oil, and starch; flavoring extracts and flavoring syrups; cane sugar; beet sugar; macaroni, spaghetti, vermicelli, and noodles; cereal preparations; malt; chewing gum; and baking powders, yeast, and other leavening compounds.

Far Eastern Markets for Dairy Equipment and Supplies. Bureau of Foreign and Domestic Commerce Trade Information Bulletin 711; 10 cents.

PATENT DIGEST

General Equipment

Refrigerated Display Case—John Edward Gloekler, Pittsburgh, Pa. No. 1,771,998, Aug. 5, 1930.

Continuous Expeller-Type Filter—John J. Naugle, Brooklyn, N. Y. No. 1,772,262, Aug. 5, 1930.

Mercury Switch Regulates Supply of Moisture to Air in Room—Carroll E. Lewis, St. Paul, Minn., to Lewis Corporation, Inc., Minneapolis, Minn. No. 1,772,611. Aug. 12, 1930.

Vertical Steam Boiler With Boiler in Firebox—John B. Hawley, Jr., Minneapolis, Minn. No. 1,774,552. Sept. 2, 1930.

Rotary Grain Cleaner—Arthur J. Hartley, Peoria, Ill. No. 1,774,710. Sept. 2, 1930.

Screen Mounting for Revolving Windows—William J. Baker, Newport, Ky. No. 1,778,713. Oct. 21, 1930.

Link Connection for Power Transmission Belts—Albert Noirit, Walsall, England. No. 1,778,912. Oct. 21, 1930.

Bucket Type Rotary Pump—Henry Orr Jackson, Los Angeles, Calif. No. 1,778,947. Oct. 21, 1930.

Machine for Sealing Cartons With Adhesives—Arthur C. Schroeder, Syracuse, N. Y., to Standard Sealing Equipment Corporation, Long Island City, N. Y. No. 1,779,985. Oct. 28, 1930.

General Processes and Products

Activated Carbon With High Content of Acid-Soluble Ash—Hans von Halban and Oskar Schober to Metallgesellschaft Aktiengesellschaft, Frankfort-on-the-Main, Germany. No. 1,774,341. Aug. 26, 1930.

Black Strap Molasses and Cereal Stock Food—John C. MacLachlan, Chicago, Ill. No. 1,774,802. Sept. 2, 1930.

Oil Removed From Cashew Shells by Molten Metal Bath—Thomas M. Rector, Rutherford, N. J., to Franklin Baker Company, New York, N. Y. No. 1,777,808. Oct. 7, 1930.

Cocoanuts Husked Mechanically—Genaro Celaya, Los Angeles, Calif. No. 1,781,215. Nov. 11, 1930.

Method for Preserving Emulsions—Albert Musher, Washington, D. C. No. 1,782,011. Nov. 18, 1930.

Manufacture of Activated Carbon—Rudolf Defris, Stockerau, Austria, and Robert Walder, Vienna, Austria. No. 1,783,110. Nov. 25, 1930.

Cake Discharged From Continuous Pressure Filter by Screw Conveyor—Jasper A. McCaskell, Salt Lake City, Utah. No. 1,784,372. Dec. 9, 1930.

Oil Removed From Cashew Shells by Sudden Change in Temperature—Edward R. Hughes to the Harvel Corporation, Morristown, N. J. No. 1,784,628. Dec. 9, 1930.

Dairy and Eggs

Foreign Odors and Flavors Removed From Milk—Roy Linden Hill to Darco Corporation, Wilmington, Del. No. 1,772,349. Aug. 5, 1930.

Temperature Regulating Agitator Coils for Milk Holding Tanks—Aage Jensen, Los Angeles, Calif. No. 1,772,898. Aug. 12, 1930.

Continuous Ice Cream Freezer—Albert T. Light, Brooklyn, N. Y., to York Ice Machinery Corporation, York, Pa. No. 1,773,912. Aug. 26, 1930.

Cheese Pasteurized Electrothermally—Clinton H. Parsons and William D. Richardson to Swift & Company, Chicago, Ill. No. 1,774,610. Sept. 2, 1930.

Electrical Milk Pasteurizer — Adolph Woodrich, Klamath Falls, Ore. No. 1,775,579. Sept. 9, 1930.

Eggs Handled and Marked Mechanically—Einar G. Larsen; one-half to Joseph Fiala, Omaha, Neb. No. 1,779,174. Oct. 21, 1930.

Milk Bottle Crate—Robert Stoddard to Milk Bottle Crate Company, Chicago, Ill. No. 1,781,825. Nov. 18, 1930.

Milk Cooling Coil — Louis Rosenfeld, Baltimore, Md., to Cherry-Burrell Corporation, Chicago, Ill. No. 1,783,100. Nov. 25, 1930.

Beverages

Carbonated Beverages Improved by Use of Dispersing Agents Such as Sulphonic Acids—Cecil Hollins and Ernest Chapman to British Dyestuffs Corporation, Ltd., Blackley, Manchester, England. Nos. 1,777,365, 1,777,366, and 1,777,367. Oct. 7, 1930.

Bottle-Capping Machine—Earl S. Burdick, Milwaukie, Ore.; Lewis B. Byrne, Portland, Ore.; and Francis W. Chausse, Salem, Ore. No. 1,780,639. Nov. 4, 1930.

A Lactic Beverage and Method of Preparing It—Willard J. Scholl to Malt-O-Matic Corporation, Jackson, Mich. No. 1,781,249. Nov. 11, 1930.

Carbonating Machine—Frederick Neuschafer, Jersey City, N. J., and Harry Botwin, Brooklyn, N. Y. No. 1,782,511. Nov. 25, 1930.

Sealing Machine for Crown-Cap Bottles—Valentine J. Mohler, Wheaton, Ill., to the Liquid Carbonic Corporation, Chicago, Ill. No. 1,782,904. Nov. 25, 1930.

Meats

Machine for Washing Meat Trolleys—Frederick J. Englen, Omaha, Neb. No. 1,774,362. Aug. 26, 1930.

Fish Dried Quickly at Low Temperatures—William Heywood Haslam, London, England. No. 1,779,470. Oct. 28, 1930.

Apparatus and Method of Chilling Meats—John P. Malone, Chicago, Ill.; one-half to Adam P. Young, Chicago, Ill. No. 1,780,267. Nov. 4, 1930.

Baking

Lactic Acid in Gelatinized Starch for Baking Powders—Elmer V. McCollum and Olaf S. Rask, Baltimore, Md. No. 1,771,342. July 22, 1930.

Growing of Baking Yeast — Hermann Claassen, Dormagen, Germany. No. 1,774,546. Sept. 2, 1930.

Manufacture of Yeast Producing High Yields—Robert McDowell Allen, New York, N. Y. and Friedrich Ernst Timmer, Westfield, Mass. to Vitamin Food Co., Inc., New York, N. Y. No. 1,775,800. Sept. 16, 1930.

Continuous Doughnut Machine and Cooker—Charles E. Carpenter, Chicago, Ill. No. 1,776,781. Sept. 30, 1930.

Multiple Dough Divider With Endless Conveyor—William G. Kirschhoff to J. H. Day Company, Cincinnati, Ohio. No. 1,778,218. Oct. 14, 1930.

Traveling Oven That is Loaded and Unloaded From the Same Opening—Robert L. Corby and Gabe R. Fennema, New York, N. Y. Nos. 1,779,962 and 1,779,963. Oct. 28, 1930.

Confectionery

Confections Decorated Mechanically — Frederick W. Greer, Cambridge, Mass. No. 1,771,117. July 22, 1930.

Nut Brittle Made Continuously—Dale G. Steely to W. F. Schrafft & Sons Corporation, Boston, Mass. No. 1,778,537. Oct. 14, 1930.

Candy Containing Extracted Vegetable Juice—Irma Huys Vander Gheynst, New York, N. Y. No. 1,781,636. Nov. 11, 1930.

Lecithin Used in Chocolate — Earl B. Working, Manhattan, Kan. No. 1,781,672. Nov. 11, 1930.

Chocolate Depositor With Detachable Molds on Endless Conveyor—Edward E. Cahoon, to Racine Machinery Company, Racine, Wis. No. 1,783,402. Dec. 2, 1930.

Caramel Wrapping Machine — Richard Anson Harris to Baker Perkins, Ltd., Peterborough, England. No. 1,784,835. Dec. 16, 1930.

Fruits

Citrus Fruits Treated With Phosphoric Compounds and Waxy Materials to Prevent Decay—Harry R. Bates to Citrus Compound Corporation, Atlanta, Ga. No. 1,774,310. Aug. 26, 1930.

Pectin From Pomace of Citrus Fruits—Hugo G. Loesch, Rochester, N. Y., to General Foods Corporation, New York, N. Y. No. 1,776,362. Sept. 23, 1930.

Apparatus for Drying Pineapples—John D. Stubbe, San Juan, Porto Rico. No. 1,778,047. Oct. 14, 1930.

Dried Fruit Sterilized by Hot Air—John G. Tyler, Charles C. Taylor, and William S. Johnson, to California Peach & Fig Growers' Association, Fresno, Calif. No. 1,782,522. Nov. 25, 1930.

Fruit Graded by Vibrating Table—James Augustus Byington, Orlando, Fla. No. 1,783,700. Dec. 2, 1930.

Adjustable Fruit-Packing Table—Edwin R. Walker, Yakima, Wash. No. 1,784,403. Dec. 9, 1930.

Sugar

Sugar Produced From Raw Cane Sugar and Beet Juice—Rudolph E. Paspisil; one-third to Edmund Kurek, Chippewa Falls, Wis. No. 1,772,911. Aug. 12, 1930.

Yield of Crystallized Sugar Increased by Ethyl Acetate — Eloi Ricard to Société Anonyme des Distilleries des Deux-Sevres, Melle, France. No. 1,776,819. Sept. 30, 1930.

Sugar Beets Dehydrated Exothermically—Brynar James Owen, Oxford, England, to Sugar Beet & Crop Driers, Ltd., London, England. No. 1,781,473. Nov. 11, 1930.

Sugar Drier—David K. Richards, Hilo, Hawaii. No. 1,782,177. Nov. 18, 1930.

Inversion of Sucrose-Containing Liquids—Leonard Wickenden, Flushing, N. Y., to John J. Naugle, Rye, N. Y. No. 1,783,551. Dec. 2, 1930.

Anhydrous Crystalline Dextrose—William B. Newkirk, Riverside, Ill., to International Patents Development Company, Wilmington, Del. No. 1,783,626. Dec. 2, 1930.

Dextrose and Non-Gummy Dextrines From Starch Liquor — Theodore B. Wagner, Brooklyn, N. Y. No. 1,784,402. Dec. 9, 1930.

Canning and Glass Packing

Continuous Automatic Can Sealing Machine—John Coyle, John C. Taliaferro, Jr., and Otto A. Schmitt, Baltimore, Md., to Continental Can Company, Inc. New York, N. Y. No. 1,767,965. June 24, 1930.

Combination Cooker and Cooler for Canners—Carl B. Thorin, San Jose, Calif., to Sprague-Sells Corporation, Hoopeston, Ill. No. 1,772,528. Aug. 12, 1930.

Wire Seal for Friction Top Cans—Victor Odquist, Yonkers, N. Y., to American Can Company, New York, N. Y. No. 1,773,850. Aug. 26, 1930.

Soft-Metal Disk Closure Supplants Friction Tops for Cans—John F. Peters, Rochester, N. Y., to American Can Company, New York, N. Y. No. 1,773,855. Aug. 26, 1930.

Can Filling Machine Discharges Predetermined Amount Under Constant Head—Joseph C. Bruno to the Vol-U-Meter Company, Inc., Buffalo, N. Y. No. 1,774,475. Aug. 26, 1930.

Machine for Halving and Pitting Peaches—Albert Stanley Ridley, Haywards, Calif., to Australasian Machines Proprietary, Ltd., Melbourne, Australia. No. 1,777,417. Oct. 7, 1930.

Measured Quantities of Peas and Brine Automatically Delivered to Successive Cans—Oswald H. Hansen, Milwaukee, Wis., to Hansen Canning Machinery Corporation, Cedarburg, Wis. No. 1,778,216. Oct. 14, 1930.

Can-Boxing Machine — Charles Milton Hesson and William John Koch, Midland Park, N. J., to the Fred H. Knapp Corporation, Ridgewood, N. J. No. 1,780,424. Nov. 4, 1930.

Solid Pack Pineapple Canned Under Vacuum — John T. McCrosson, Port au Prince, Haiti. No. 1,782,761. Nov. 25, 1930.

Fruit Grader and Distributor—Dana E. Keech, Glendale, Calif. No. 1,782,826. Nov. 25, 1930.

Screw Cap Capable of Expansion for Removal—Harold J. Carr, New York, N. Y. to Anchor Cap & Closure Corporation, Long Island City, N. Y. No. 1,784,089. Dec. 9, 1930.

NEW EQUIPMENT FOR FOOD MANUFACTURERS

New Cone-Seat Valve

STEAM valves with special threaded stem construction for keeping the valve tight and at the same time capable of being easily opened and closed have been made available by the Consolidated Ashcroft Hancock Company, Inc., Bridgeport, Conn. These valves find application in food processing plants where cold and hot water used for washing and rinsing purposes and steam for sterilizing are run through valved pipes into a mixing tee to which a hose is attached.

Valves that keep tight but are easily opened and closed by the operator, whose hands are usually wet, are said to add at least 50 per cent to the life of the hose and cut down valve maintenance cost, as well as prevent steam wasting.

A New Type Truck Body

DESIGNED for full or partial refrigeration, the compartment truck body built by the Hercules Products, Inc., Evansville, Ind., lends itself to diversified uses in the food field.

The two insulated compartments have separate containers for the refrigerating material, such as crushed ice and salt. These tanks are placed crosswise on each of the center partitions and are filled from the same hatch on the side of the roof.

The walls of each compartment are a triple-layer construction of plywood, dry-zero blankets, and a pressed wood insulation board. The entire body is covered with heavy automobile sheet steel. Its construction recommends its use by packers, dairies, creameries, and confectioners for long-haul and route delivery service.

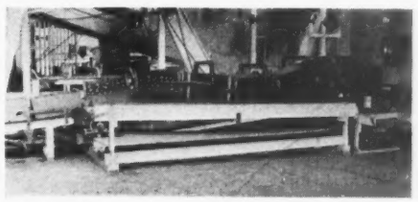
An ice cream body, mechanically refrigerated, is also manufactured by the Hercules Products, Inc. This body has three fully insulated and refrigerated compartments, whose walls have the triple-layer insulation construction. It has a capacity of 350 gal. of ice cream in 5-gal. cans.

Boxes Emptied Mechanically

ALTHOUGH the machine shown in the illustration was designed for dumping fruit from boxes onto a conveyor washer, it has possible application to any box-dumping operation.

Manufactured by Edward D. Westrip, 309 Jefferson Ave., Pomona, Calif., this dumping mechanism consists of a series of corrugated, spindle-shaped rollers mounted in pairs at right angles to each other and driven by a common shaft. Each succeeding pair of rollers is mounted at a slight angle in relation to the preceding pair, so that a box moving along the series is gradually tilted through an angle somewhat greater than 90 deg. The remaining half of the series of rollers tilts it back to its horizontal position. An adjustable guard rail keeps the boxes from falling out of the machine. The rolls are equipped with ball bearings which are protected from dust and dirt by felt oil-retaining washers. There are no clutches or intermittent movements in the machine, nor any device that requires attention other than occasional oiling.

The machine is mounted in the conveyor line that carries the filled boxes to the washer. Its construction permits three boxes to be dumped at a time and assures gentle handling of their contents, even though the machine has a handling capacity of 1 to 40 boxes per minute. The receiving conveyor is part of the complete unit and is designed with the proper pitch and speeds

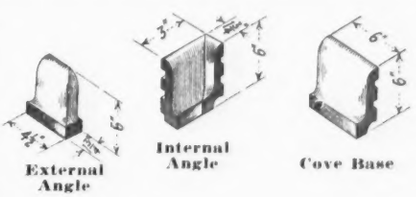


to take the material away after it is dumped from the boxes.

The dumping machine can be furnished to dump either from the left or the right.

Industrial Floors Made More Attractive

COMBINING neat and attractive appearance with durability and acid resistance, the base-tile forms shown in the accompanying illustration add beauty to an industrial floor installation. Floorings, such as Duratyle, installed by the Drehmann Paving & Construction Company, 508 Glenwood Ave., Philadelphia, Pa., are familiar to meat packers, bakers, and dairymen for their ability to withstand heavy usage and extreme changes in temperature without chipping or checking, and to resist



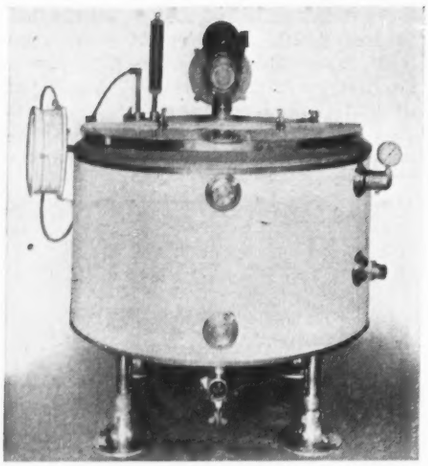
the penetrating and destructive action of moisture and acids.

With the introduction of these graceful base units it is now possible to give processing rooms pleasing appearance as well as industrial practicality. These units, like the floor tile, can be installed over the existing masonry construction and are to be had only in the darker shades of red.

New Glass-Lined Steel Vat

A LATE addition to the list of glass-lined steel equipment designed for use in the dairy industry is the Lo-Vat unit of the Pfaudler Company, Rochester, N. Y. This machine can be used as a milk pasteurizer, ice cream mixer, buttermilk tank, or cooler for certified milk. It is made in 100- and 200-gal. sizes and is equipped with two-speed overhead motor drive, impeller agitation, and a 3-in. leak detector flush valve and steam inlet.

Its cadmium-plated metal parts, which



are highly polished to facilitate cleaning, may be protected from damage during dumping operations by a can rail, which is supplied if wanted. When desired, an ultra-violet-ray machine is attached for irradiating purposes.

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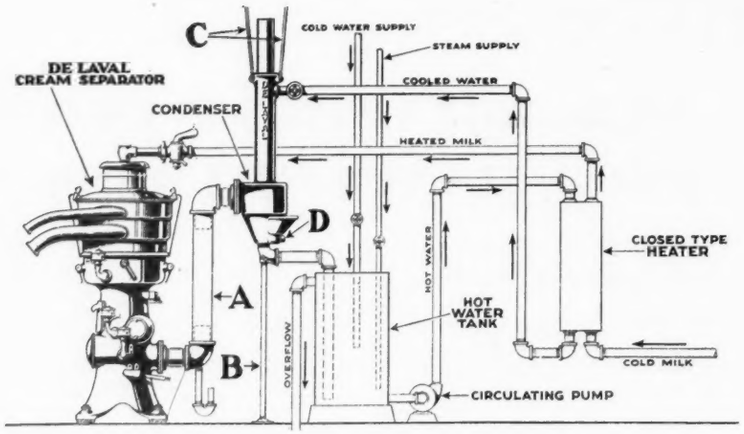
Packages Given Tight Seal

SUBSTANTIAL changes have been made in a line of standard wrapping machines to give favorable performance with moisture-proof wrapping material. The illustration shows one of the machines perfected by the Package Machinery Company, Springfield, Mass., which have had a marked influence on the widespread adoption of transparent, moisture-proof wrapping for food products during 1930.

This machine is equipped with thermostatic controlled heaters which are said to give packages a moisture-proof seal. An automatic paper-stop regulates the wrapper feed to the machine in such manner that, although the machine may run continuously, wrapping material is fed in only when a package passes through.

Machines of this type are produced to wrap packages of various sizes and shapes with a tight seal wrapping. They are of the same general type as those that have given satisfactory performance with printed labels and wax-paper wrappings.



Exhaust Steam Utilized In Separator

A NEW water-heating condenser developed by the DeLaval Separator Company, New York City, permits an interchange of heat which allows steam obtained from the exhaust of the turbine-driven separator to be utilized to warm milk to 40 deg. F. before it enters the separator.

The condenser is constructed to utilize all the steam that passes throughout the turbine and to lead off the heated water through an outlet below the level of the steam inlets. From the condenser the steam-heated water passes to a storage tank, where, if necessary, its temperature can be raised or lowered by steam or water direct from the lead-in lines to give the milk the desired temperature of 40 deg. F. as it passes through the heat interchanger.

In this manner the power and heating expense of operating a turbine-driven separator is reduced approximately one-half. Elimination of escaping steam cuts down the installation cost of the separator and reduces the size of heating plant necessary to produce steam for heating the milk and driving the separator.

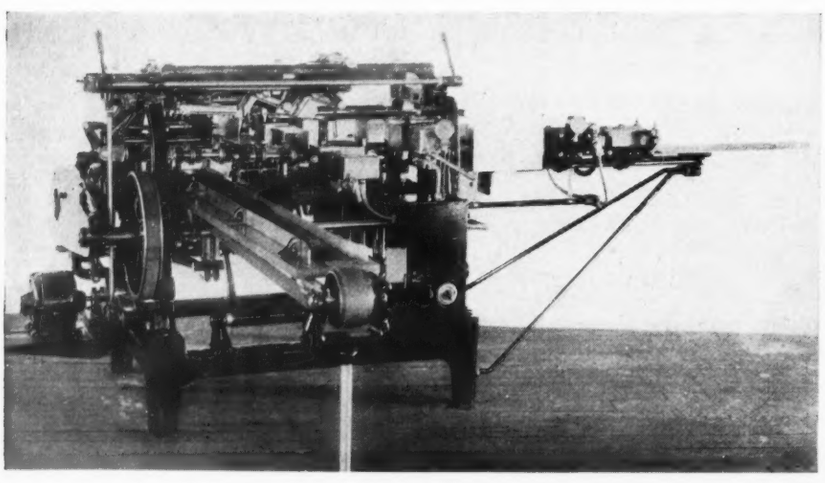
MANUFACTURERS' PUBLICATIONS

Valve Capacity Charts—The Fisher Governor Company, Marshalltown, Iowa, has prepared a set of capacity charts, giving the valve travel coefficient for standard body, methods for determining air or gas capacities of Fisher specialties, and for determining the sizes of all Fisher steam reducing valves.

Colloid Mills—In a 12-page bound booklet, Chemicolloid Laboratories, 44 Whitehall St., New York City, illustrates and describes its Charlotte Colloid Mills and give their specifications in table form.

Satchel Bag Packaging Machine—Automatic machinery for filling and packaging containers of the satchel bag type are illustrated and described in an attractive folder prepared by the E. C. Anderson, Inc., 15 Park Place, New York City.

Non-Metallic Gears—General Electric Company, Schenectady, N. Y., in a folder calls attention to its Textolite gears, consisting of cotton fiber held in compression by synthetic resin, acting as a binder.



Floor Tile—Ryltyle manufactured by the Acme Brick Company, Danville, Ill., is described in a 16-page illustrated booklet distributed by the Drehmann Paving & Construction Company, Philadelphia, Pa. Installation photographs, design styles, and a classified list of users are included.

Insulated Truck Bodies — In a 12-page loose-leaf folder, Dry-Zero Corporation, 130 North Wells St., Chicago, Ill., describes, illustrates by photograph and diagrammatic drawings, and gives statistical data concerning its insulated bodies for delivery trucks.

Frozen Dainties—A 20-page booklet attractively bound has been prepared by the Coignet Gelatines, 17 State St., New York, N. Y. It contains recipes and illustrates equipment applicable to the production of frozen desserts employing the use of gelatine.

Water Tube Boilers—Catalog No. 98, describing the Murray type A water tube boilers, has been published by the Murray Iron Works Company, Burlington, Iowa. Its 24 pages are well illustrated with photographic cuts and diagrammatic drawings showing different types of boilers and characteristic installations.

Westinghouse Developments—In a series of illustrated leaflets and folder releases, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces its oil-immersed induction regulators, its single-stage condensate pumps, its methods of testing electric welds, its line-drop compensators without contacts or taps, and its fractional hp. motors, type A.D. and A.D.S.

Synchronizing Bread Slicer—In illustrated leaflets, the Mac-Roh Sales & Manufacturing Company, 710 Kahl Building, Davenport, Iowa, describes the Rohwedder bread slicer with varying capacities synchronized to meet wrapping-machine conditions.

Resistance Thermometers—An illustrated 28-page booklet devoted to instruments for controlling, recording, and indicating temperatures has been published by Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa. It is known as catalog No. 80 and includes definitions of pyrometric terms, a list of Leeds & Northrup's publications, and specimens of the different charts used.

A Year's Progress in

FEDERAL FOOD ACTIVITIES

Technical, economic and legal problems of vital significance to food manufacturers are constantly under consideration in more than a dozen bureaus of the departments of Agriculture and Commerce. Some of the more important findings, as expressed in the bureau reports for the last fiscal year, July 1, 1929, to June 30, 1930, are summarized here. Although such a summary necessarily cannot be complete, it will, at least, indicate the extent of the work, and provide a few guideposts for those interested in specific phase of governmental activities.

Report of Secretary of Agriculture
U. S. Department of Agriculture

THE drought which prevailed during much of the 1930 crop-growing season was the worst ever recorded in this country. Only in the case of a few commodities was the drop in production partly compensated by a rise in prices, because the cut in farm production coincided with a sharp decline in the demand for farm commodities resulting from the general economic depression.

An increase in total acreage planted of about 1 per cent was made over the previous year. Among the crops having a particularly large increase in acreage were: Flaxseed, 47 per cent; beans, 12 per cent; rice, 10 per cent; and rye, 9 per cent. Total wheat crop was about 840,000,000 bu., as compared with 806,000,000 bu. in 1929 and an average of 833,000,000 bu. for 1924 to 1928. Fruit production was at least one-fifth greater than 1929, prunes, plums and apricots being abundant, and a good crop of citrus fruits also being indicated.

For cattle slaughtered under federal inspection during the first eight months of 1930, producers received 18 per cent less in gross value, although the total slaughter was only 1.4 per cent less. Hog producers, with an 8 per cent lower slaughter, received a 14 per cent lower return. Returns to lamb feeders, despite a 21 per cent increase in marketings, were approximately $10,000,000 less than in the preceding season.

Though the drought caused a heavy drop in dairy production during the pasture season and prevented the problem of overexpansion from becoming as acute as it might have become, the dairy industry faces the combined influence of lessened consumers' demand, both at home and abroad, with a continuing tendency toward expansion. The poultry market, as well as the egg market, was oversupplied in 1930. However, the lower prices stimulated poultry consumption. In the first nine months of 1930, the consumption was 15 per cent heavier than in the corresponding months of 1929. Hence the prospect for 1930 is not unfavorable.

One aspect of the farm problem overshadows all others. Production in a number of important lines is out of balance with the market, and surpluses pile up continuously. "Let us not deceive ourselves," says the report, "by saying that real overproduction is impossible, since all foods produced are eventually consumed at some price. There is overproduction if the price received does not exceed the cost of production by a margin sufficient to give the reasonably efficient farmer a fair enough income."

Food and Drug Administration

A gratifying feature of food and drug enforcement activities during the year has been the evidence of renewed public interest in the government activities. Approximately 36,000 samples of food and drugs were collected and examined. Seizures of food totaled 571, and 63 prosecutions were instituted. Of the import samples examined during the fiscal year, 2,247 food items were detailed. Penalties and bonds collected during the year amounted to $41,349.81.

The cases of food poisoning investigated during the year were of the type in which bacteria responsible for the illness are almost invariably introduced in the product in local handling or in the process of preparation for the table. No cases of botulism attributable to commercially packed foods occurred in the United States during the 12-month period.

A pamphlet giving reliable information in regard to fig testing and the proper handling of fruits was prepared as a result of work done in California, and its recommendations have been largely adopted by the fig industry.

Since 1922 the control of maggots in the blueberry output of Maine canneries has been under active investigation. Eighty samples were examined during the year and nine seizures, totaling 2,326 cases, were made. Seizures of approximately 80,000 cans of unpeeled pie peaches resulted from infestation by the plum curculio.

Continuous control to eliminate canning of partially decomposed salmon has resulted in great improvement. Of the 1,801 lots, totaling 3,664,905 cases, examined, only three prosecutions and twelve seizures resulted. Twenty-four seizures were made of canned tuna fish in California and fourteen seizures of Maine sardines.

Excessive moisture was responsible for numerous actions involving butter and cheese, 246 regulatory actions involving butter and 11 involving cheese having been executed. During November, more than 5,000 cases of canned tomatoes were seized from various points in the South because analysis showed them to have been adulterated with water.

The food standards committee held two meetings during the fiscal year. At the October (1929) meeting revised definitions were adopted for mayonnaise, salad dressings; for milk, pasteurized milk, skim milk, and for goats' and ewes' milk. During the spring meeting definitions were adopted for fruit juice, grape juice, and orange juice. After a public hearing, final definitions were adopted for whole-wheat flour, entire-wheat flour, and graham flour, and a definition and standard for white flour was revised. Definitions for various soda-water beverages and beverage flavors have been published for comment and criticism.

Bureau of Chemistry and Soils

The Bureau functions not only as a research agency to increase efficient unit production on the part of the farmer but must follow the products of the farm through the industrial processes that make use of agricultural products. The widening of markets for farm products through the development of new channels for industrial utilization is one of its important functions.

A more complete utilization of cane juice for syrup production in the adjustment of quality in relation to market requirements is one of the foremost research projects. Procedure has been worked out whereby a blending syrup of

U. S. Dept. of Agriculture

Thousands of letters from housewives bring to W. R. M. Wharton, chief of the Eastern District, Food and Drug Administration, proof of the interest in his "read-the-label" radio talks

satisfactory quality may be produced from the last mill juice at reasonable cost. Investigation of the cause and remedy for swells in canned cane syrup was continued.

A satisfactory method for automatic control of pH in second carbonation of sugar-beet juice was devised and indications were given whereby this information could be applied to third saturation of the juice. Improvement and accurate definition of the color standard established for maple syrup was made.

Experiments to ascertain the suitability of sweet-potato starch for commercial use were continued and results so far indicate that commercially satisfactory conversion products can be made from it.

With increasing facilities for the storage and distribution of food products at greatly reduced temperatures, the question has arisen whether many of the fruit juices which undergo deleterious changes on sterilization can be satisfactorily prepared by freezing. This investigation is progressing, and there are now in storage several hundred packages of citrus and other products which are frozen at temperatures ranging from 30 deg. to 50 deg. F. below zero. The possibilities of different types of packages are being investigated and methods devised for packaging the product in inert gas and under high vacuum.

Studies of the waterless canning of non-acid vegetables have been continued by the experimental canning of whole-grain sweet corn. Experiments have shown that in the preparation of corn by this method the most practical length of scalding is approximately 10 min. and the best method of seasoning is the addition of salt in the form of saturated brine.

Bureau of Agricultural Economics

The outstanding accomplishments of the division of crop and livestock estimates have been development and improvement of forecasts and estimates covering more than twenty vegetable crops; the preparation for the Bureau of the Census of average farm prices by counties for 156 crops and livestock products for the 1929 marketing season; the completion of estimates of farm income by states of the five-year period 1924 to 1928, and statistical improvement in the technic of crop forecasting.

The total number of inspections of fruits and vegetables again showed a substantial increase over preceding years. Shipping point inspections increased by 14,500 cars over last year and receiving point inspections by 7,108 cars. Total number of inspections for both services was 288,436, as compared with 266,831 for the preceding year.

During the fiscal year standards for four additional fruits and vegetables had been issued, and eleven sets of grades had been revised. United States standards for 46 commodities have been issued by this division. An outstanding development in standardization work has been the increasing interest shown by canners and producers of products used for canning in the establishment of standards for canning crops. Reports showing an increasing trend to motor-truck transportation of fruits and vegetables were made.

The meat-grading service has proved to be very satisfactory in the fifteen cities where it is available. Demand from commercial interests has increased as the service has become better known. More than 22,500,000 lb. of meat was graded during the year. One of the features of the meat grading service which has brought its value prominently to the front is its use in connection with the sale of prepacked and ready packaged fresh (unfrozen) meats of all classes. Developments indicate that this method of retailing meats, involving the use of government grade labels, may become an important factor in the meat trade. Many large chain stores operating markets in the eastern half of the country are now selling United States graded stamped meats in their markets.

A study of consumers' habits and demand for quality in eggs was undertaken in Boston, New York, Newark, and Washington. Results indicate that eggs are not well graded for quality in retail channels and there is much to be done in teaching both the trade and housewives the quality of eggs of various U. S. grades and the use of each grade. At practically every market where butter and egg grading service is rendered there is an increased demand for the service, especially where the privilege of issuing certificates for quality is used.

A total of more than 8,000,000 lb. of dressed turkeys was graded at both shipping points and terminal markets. The inspection of poultry and canning plants was expanded during the year to eight plants in the New York district, nineteen in the Chicago district, and two plants in California. During the year a total of 25,260,000 lb. of poultry was inspected and approximately 4.3 per cent rejected as unfit for food.

The greatest growth under the warehouse act during the past year was in the licensing of grain warehousage, the licensed storage capacity for grain having been increased more than 50 per cent over the preceding year. A substantial increase also occurred in the licensed storage space for canned foods. This has been brought about by the credit needs of canners and by the desire of many canners to avail themselves of a grading service offered under the warehouse act. Buyers of canned vegetables, particularly chain stores, have also played a part in the extension of this grading service.

Bureau of Plant Industry

Studies have developed that when apples are bruised from maintained excessive pressure, deep watery bruises such as are caused by freezing are produced. Such characteristics were formerly considered as convincing proof of injury by freezing.

Preliminary experiments on "frozen pack" fruits indicate that all such fruits should be packed with sugar to assure good quality. Hermetically sealed containers gave a better product than those which air could enter. Berries in general were very good when packed this way. Peaches were of good quality when removed from the cans, but darkened quickly. Results with pears, apricots, and sweet cherries were not promising.

Bureau of Dairy Industry

In the research laboratories division, progress has been made in determining the conditions which control the germination of bacterial spores in milk. Among the factors studied are food supply, concentration of neutral salts, and osmotic pressure.

Some significant results have been obtained in the last year on the influence of the hydrogen-ion content of

milk on the color of cake in which it is used. It is indicated that even inferior butter gives the cake a better flavor than some of the prepared shortenings. Apparently the reason why butter is not more extensively used in bakery cake is the difficulty of getting a satisfactory emulsion. Work has been started on this problem.

The results of using whey proteins in the manufacture of ice cream are conflicting, but they show a distinct effect on the physical properties of the mix. Additional work will be required to determine whether or not their use will be beneficial. Similar work has tended to show that milk heated to a relatively high temperature before drying gives a powdered milk which produces an ice cream mix of better texture. Losses due to shrinkage and rind can be eliminated and a very readily salable product produced by canning Cheddar cheese fresh from the press, studies indicate.

Bureau of Animal Industry

A comprehensive study of methods used by packing establishments in the canning of cured pork meats at twelve packing plants was undertaken by the Bureau. In addition, samples of the canned meat were subjected to chemical, physical, and bacteriological investigation. A study also is being made of the keeping quality of such products when subjected to unfavorable temperature conditions, but has not progressed far enough to warrant conclusions.

The work of the federal meat-inspection service showed an increase of 1.4 per cent in the total of animals slaughtered over the preceding year, and an increase of 4.4 per cent over the ten-year average. Inspection was conducted at 804 establishments during the year. More than 18,000 labels and other markings for meat and meat products were approved for domestic establishments and 1,267 failed of approval on account of being misleading or deceptive.

Bureau of Home Economics

In the food and nutrition division of the Bureau, the work is continuing under three sections: Approximate composition of foods, nutrition studies, and food utilization and preservation.

New summary tables and approximate composition of 121 classes and varieties of fresh vegetables have been completed and are in press. The new tables indicate the extent of variations in the composition of individual samples as well as the average figures. Vitamin studies have been made on watermelon, spinach, green and ripe olives, banana powder, grapes, and commercial grape-juice products.

The work on the palatability of meat, handled in co-operation with the Bureau of Animal Industry, was continued. During the year 800 roasts of various kinds were cooked. So far there appears to be no definite relation between roasting temperature and the tenderness and flavor of beef and lamb roasts. There is, however, a close relation between cooking loss, or shrinkage, and oven temperatures.

During the past year the first quality tests on vegetable foods were begun in co-operation with the Bureau of Plant Industry. An interesting result was the fact that a storage condition of potatoes affect the cooking quality very materially, due to the accumulation of sugar in potatoes held at low temperatures. This sugar browned when the potato was fried, and it was therefore impossible to make good potato chips with potatoes stored at temperatures of 50 deg. F. and below.

Bureau of Foreign and Domestic Commerce (U. S. Department of Commerce)

In the face of a difficult trade year, the Bureau of Foreign and Domestic Commerce attempted to allay misapprehension and promote stability by expanding its statistical services and by rushing to completion those researches which could be hurried. Requests to the Bureau were 1,000 per day more than in the previous year, those services dealing with foodstuffs alone totaling 252,371.

In domestic commerce work, the Bureau completed a number of studies, most important of which was the Market Data Handbook of the United States. This report won the Harvard award in advertising research. Results of the Louisville (Ky.) grocery survey were put to practical use as soon as published. Portions of the survey were widely reprinted, and the Louisville Board of Trade placed its minimum value to that city at $100,000. A study of credit and business failures made as part of the survey confirmed the importance of knowing where good business practice ends and sympathetic tolerance of unpaid accounts begins.

To the series of studies of food production and consumption were added a survey of the mayonnaise industry and one conducted in co-operation with kraut manufacturers. A survey of the jam and jelly industry is now in progress. A study in trends and consumption of foodstuffs over the last 30 years has been completed, and a new project has been undertaken for the National Confectioners' Association on the cost of distributing candy.

Plans have been worked out whereby the studies of wholesale grocery distribution cost will be carried on co-operatively with a group of wholesale grocers. Reports of foreign tariffs and import regulations were carried further in "Canned Foods in Europe" and "Canned Foods in the Western Hemisphere." The citrus fruit trade commissioner completed a study of the principal European agencies engaged in citrus fruit distribution.

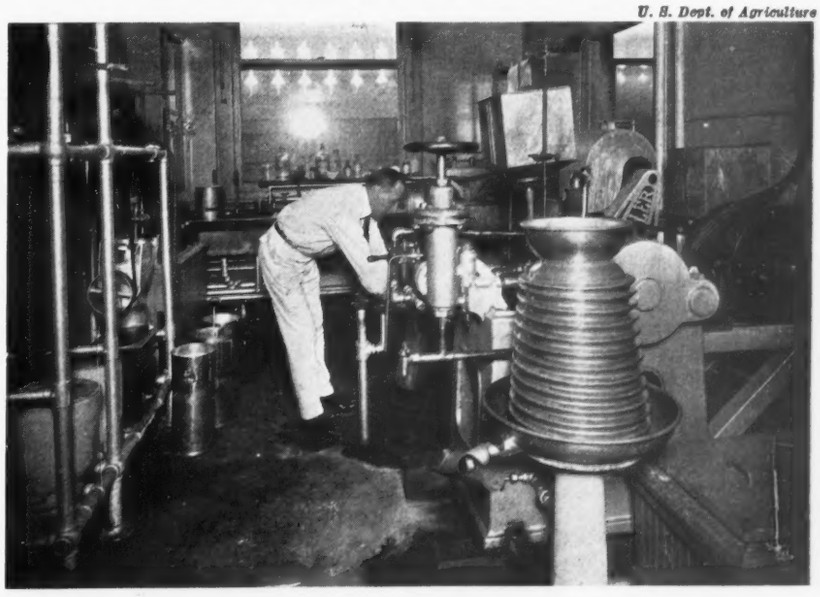
Despite the large amount of domestic work, foreign commerce continues to be the Bureau's largest field of service. More than $50,000,000 in new business and savings in the foreign trade field during the year are definitely known, but much of the value of this work necessarily remains intangible.

Bureau of Fisheries (Department of Commerce)

A sound economic position for the commercial fisheries and intensified interest in their future was noted by the Bureau for the fiscal year ending June 30, 1930. The annual harvest now exceeds 3,000,000,000 lb., for which the fishermen receive $116,000,000. In 1929, as compared with 1928, there were substantial increases in the output of packaged and frozen fish, canned products, byproducts, imports, and exports. In the fresh fish trade of 1929, 84,397,000 lb., valued at $14,813,000, was prepared in package form. This trade showed an increase of 29 per cent in amount and 51 per cent in value over 1928. The canned product in 1929 amounted to 689,447,000 lb., valued at $101,065,000, and the output of cured and smoked product is estimated at 150,000,000 lb., valued at $12,000,000. Fishery byproducts are valued at $23,768,000.

In the ice cream laboratory of the Bureau of Dairy Industry, tests are made under conditions similar to those in commercial manufacture

U. S. Dept. of Agriculture



NEWS OF THE MONTH

Freezing of Vegetables And Fruits Discussed

NECESSITY for developing more satisfactory channels of distribution for consumer packages of frozen foods was the outstanding conclusion brought to light at the conference on frozen fruits and vegetables held in New York on Dec. 9. Arranged by the New York Food Marketing Research Council, the meeting brought together a large number of authorities in various phases of the industry as speakers and an audience of several hundred. R. S. Alexander, professor of marketing at Columbia University, presided at the meeting.

The rapid growth of the cold-pack method for preserving cherries was brought out by W. H. Ullsberger, manager of the Fruit Growers' Canning Company, Sturgeon Bay, Wis. Five years ago, he pointed out, only 5 per cent of this company's output was frozen, but last year more than 50 per cent was preserved in this way.

A new and advantageous kind of frozen asset came to the aid of Georgia peach growers this year, said W. R. Tucker, in describing the work which led up to the freezing of 700,000 lb. at the plant of Tom Huston Frozen Foods, Inc., last summer. Despite the fact that many unexpected difficulties arose, the company earned a profit, he added.

Clarence Birdseye, leader in the General Foods Company's "frosted foods" development, stressed the fact that each variety as well as each product varies in its suitability to freezing. He maintained that goods frozen in bulk cannot be quick-frozen throughout, no matter how low the temperature of the freezing medium, because of the low heat-transfer rate through the product itself.

Absorption system refrigerator cars can solve the problem of maintaining constant temperature in the shipment of frozen foods, according to Horace M. Wigney, manager of Safety Refrigeration Corporation, New York City. During the past two and one-half years, nearly 50,000,000 lb. of perishables, about 50 per cent of which was frozen, was shipped in such cars, he said.

The necessity for vacuumization to prevent oxidation of certain fruits requires the use of rigid containers such as tin, Edward S. Reynolds, of American Can Company, brought out. Education of the housewife to realize that frozen foods so packed are highly perishable when defrosted, however, presents a difficult problem.

FOOD INDUSTRIES was founded in October, 1928, by the McGraw-Hill Publishing Company, with Dr. H. C. Parmelee as editor. The present editorial staff is Laurence V. Burton, editor; Graham L. Montgomery, managing editor; E. S. Stateler, R. S. McBride (Washington, D. C.), Earl D. Stewart (San Francisco, Calif.), and Louis C. McCarthy, assistant editors; and E. Scott Pattison, editorial assistant.

Action of bacteria, yeasts, and molds in connection with frozen fruits and vegetables was discussed by C. A. Magoon, senior bacteriologist of the Bureau of Plant Industry, U. S. Department of Agriculture. Stressing the fact that micro-organisms are not killed by freezing, although their growth is inhibited, he urged that close attention be given this problem, particularly in the case of such vegetables as peas, where growth of dangerous bacteria would be possible under improper freezing or storage conditions. Elimination of a "hay-like" flavor from enzyme action is still a problem in freezing certain vegetables, he stated.

A luncheon at which frozen products constituted the bulk of the meal was served during the conference. Grapefruit, filet of sole, leg of lamb, peas, spinach, cherries, and peaches were included on the menu.

Corn Canners Make Plans For New Organization

DELEGATES from more than 64 different corn canning plants in eight states, with a combined production of 10,000,000 cases out of a national total of about 17,000,000, met in Chicago two weeks ago to draw up plans for a new association. Formal organization of the group and a program of its activities will be announced during the National Canners' Association convention which opens in Chicago on Jan. 19.

The purpose of the organization, it is said, is to promote greater consumption of canned corn among the people of the United States, to improve the quality of their product, and general conditions in the industry. An effort will be made to maintain a balance between domestic consumption and production.

Ruling on Yellow Margarine Fought by Dairy Industry

A RECENT ruling by the Bureau of Internal Revenue to the effect that yellow margarine in which the color is due solely to the presence of palm oil is not "artificially" colored, and therefore not subject to the usual 10 cent tax, has occasioned immediate objections from dairy interests. At least one manufacturer, the Glidden Company, has announced plans to market a yellow margarine made by this process in the near future.

A. M. Loomis, secretary of the National Dairy Union, has asked that the ruling be suspended pending further investigation. W. F. Jensen, manager of the American Association of Creamery Butter Manufacturers, points out that palm oil "is not a necessary or important element in oleomargarine manufacture. If palm oil is used in margarine now, the purpose and the intent is to impart a yellow color to the finished product. This I believe, is violating present oleomargarine laws, whether the use is 1 per cent, 10 per cent, or 20 per cent in the finished product."

COMING EVENTS

JANUARY

5-7—Northwest Canners' Association, Multnomah Hotel, Portland, Ore.
13—Southeastern Millers' Association, Nashville, Tenn.
19-23—National Canners' Association, National Preservers' Association, National Pickle Packers' Association, National Food Brokers' Association, Canning Machinery and Supplies Association, Stevens Hotel, Chicago, Ill.
23—Evaporated Milk Association, Chicago, Ill.
26—Associated Bakers of America, Sherman Hotel, Chicago, Ill.
27-29—Western Confectioners' Association, Olympic Hotel, Seattle, Wash.
31—American Cranberry Growers' Association, Walt Whitman Hotel, Camden, N. J.

FEBRUARY

10-11—American Honey Producers' League, Toronto, Ont.
12—National Cheese Producers' Federation, Plymouth, Wis.
12—National Malt Products Manufacturers' Association, Chicago.
26-28—Canners' League of California, Del Monte Hotel, Del Monte, Calif.

MARCH

—Dairy Products Association of the Northwest, St. Paul, Minn.
16-19—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago, Ill.
18—United States Beet Sugar Association, Washington, D. C.
30—April 3, American Chemical Society, Indianapolis, Ind.

Label Restrictions for Corn Sugar Removed by Secretary Hyde

CORN sugar no longer must be declared on the label of any food product in which sugar is a recognized ingredient, according to the Dec. 26 ruling of Secretary Hyde, given elsewhere on this page. This ruling completely reverses the department's previous policy governing the use of dextrose. Placing dextrose on a par with sucrose was a surprise, because of the long delay in announcing a decision following the hearing given to corn sugar manufacturers last July.

Secretary Hyde's ruling is generally regarded in Washington as primarily a farm relief measure. In a statement accompanying the formal announcement, he seeks in emphatic terms to justify his action. He declares in this statement that the opening of this potential market for more corn is a step in the right direction. But he also states that his action is justified by the transition of corn sugar from "a muddy, brown product less than 50 per cent as sweet as sucrose to a clear, clean, white granulated sugar, a wholesome and healthful food, now about 75 per cent as sweet as cane sugar."

Pointing out that declaration on the label of the presence of corn sugar is required not by the Food and Drugs Act but by administration interpretation of the law, Secretary Hyde said that the reason for the old ruling has disappeared and that the discrimination against corn sugar, based on ancient prejudice, should be removed.

Secretary Hyde stated flatly that he could not agree to the proposition that sugar invariably means sucrose to the consumer. No comment was obtainable from officials in immediate charge of enforcement of food regulations, other than that Secretary Hyde's decision would have a far-reaching effect.

GREAT interest has been aroused by the ruling of the Secretary of Agriculture, on Dec. 26, concerning corn sugar. Apparently, even the executives of the Food and Drug Administration were not expecting the Secretary to give a favorable decision, since the controversy had seemingly been side-tracked.

In September, FOOD INDUSTRIES predicted that Secretary Hyde was letting himself in for a host of troubles by his consent to review the pleas for and against a change in the regulations concerning corn sugar. In removing the labeling restriction he probably has increased his troubles and those of all charged with the duty of maintaining the pure food laws. Present regulations of federal and state governments will need to be changed to include dextrose along with sucrose in all standards for foods with added sugar content. Since only eighteen states automatically apply federal food standards, in the remaining 30 the state authorities will be compelled to take a stand. These and numerous other results of the ruling are likely to cause great confusion until the situation is clarified.

FOOD INDUSTRIES has no quarrel with the use of dextrose. We recognize that it has become an indispensable ingredient of many manufactured foods. It probably will find a useful place in many others. But its makers still have a big selling job ahead. Optimistic forecasts of greatly increased demand for corn sugar seem premature.

Undoubtedly, those whose future business is threatened by this ruling will seek retaliatory measures. One can visualize certain labels of the future guaranteeing a product to contain no added corn sugar, which, in time, may bring about litigation and Federal Trade Commission ruling that closely approximates that growing out of the lengthy squabbles centered around baking powder and tomato catsup. Little can be gained now by complaints of the opponents of the ruling. The fact is accomplished. The next move is to prepare for what readjustment may be necessary.

The Secretary of Agriculture has justified the ruling as in the interest of progress and agricultural relief, based on opening a broader market for corn, although a 100,000,000-bushel increase in a 3,000,000,000-bushel crop will hardly be noticeable. Apparently, the plan is to enrich the corn-belt farmer by offering him a market that is taken away from the beet and cane growers. It would appear that the beet grower of the states west of the Mississippi will do whatever relieving of corn-belt distress that may be accomplished.

Considered from its purely agricultural aspect, the new ruling is regarded as one that has a long way to go before it proves its efficacy as a relief measure. Its political effect is likely to be very, very sad.

—The Editors

The Official Ruling

Corn sugar (dextrose) when sold in packages, must be labeled as such; when sold in bulk must be declared as such; but the use of pure refined corn sugar as an ingredient in the packing, preparation or processing of any article of food in which sugar is a recognized element need not be declared upon the label of any such product.

Nothing in this ruling shall be construed to permit the adulteration or imitation of any natural product, such as honey, by the addition of any sugar or other ingredient whatever.

[Signed] ARTHUR M. HYDE,
Secretary of Agriculture.

Chains Oppose Smaller Evaporated Milk Can

THE change in standard size of the tall can of evaporated milk from 16 oz. to 14½ oz., announced a few weeks ago by the Evaporated Milk Association, is meeting vigorous protests from chain store executives. The National Chain Store Association has issued an official protest against the shift to the smaller size, which is scheduled to go into effect about Feb. 1.

Because of the rapid turnover in chain grocery stores they usually are the first to distribute altered packages. Several times in the past, W. K. Henderson and other "chain baiters" have taken advantage of this fact in their efforts to prove that the chains sell smaller sizes. While such a condition is only temporary, "inevitable injustice and injury will result," according to the Chain Store Association.

Adequate publicity will reduce any such misunderstandings to a minimum, according to Frank E. Rice, manager of the Evaporated Milk Association.

Industrial Uses for Sugar Sought at Mellon Institute

A BROAD investigation into possible industrial uses for raw and refined sugar has lately begun at Mellon Institute of Industrial Research, Pittsburgh, Pa., Dr. Edward R. Weidlein, director, has announced. The research will be carried on by a multiple industrial fellowship sustained by The Sugar Institute, Inc., an organization that represents the cane sugar refiners of the United States.

The comprehensive program of investigation will be supervised by Dr. George D. Beal, assistant director of the institute, and by Dr. Gerald J. Cox, senior industrial fellow. Close advisory collaboration will be given by Dr. Leonard H. Cretcher, sugar specialist, who heads Mellon Institute's department of research in pure chemistry.

Labels and Standards for Mapes Law Meet Opposition at Hearing

OBJECTIONS both to the label declaration proposed for sub-standard canned goods by the Food and Drug Administration and to the method employed for defining the standards under the Mapes amendment to the Food and Drugs Act were presented by canners at a hearing held in Washington on Dec. 15.

The legend suggested by the Department for designating substandard goods reads: "Below U. S. Standard—Legal—Wholesome." All the representatives of the industry present opposed the words "Legal—Wholesome," as actually commending goods of inferior quality. Hall Wrightson, representing the Tri-State Packers' Association, Easton, Md., expressed the view of the majority when he said that such a description would be used as a sales argument for the lower grades and actually accord to them an official recommendation that is not accorded to higher grades.

LABELS on canned foods falling below standards set up under the Mapes amendment should point out not only that the food is "below U. S. Standard" but that it is fit to be eaten, even though off-grade and presumably somewhat unpalatable, and not to be confused with the better grade.

FOOD INDUSTRIES is of the opinion that this qualifying statement in the legend cannot be made adequately in two words. A statement reading somewhat as follows would be clear to the consumer, and at the same time avoid any implication of approval that might be read into such words as "Legal—Wholesome":

Below U. S. Standard

Fit for Human Food

—The Editors.

Mr. Wrightson and several others argued that the mere statement "Below U. S. Standard" would be sufficient, but Mr. Campbell held that if this statement only appeared on the can the public would get the impression that it is an outlawed product. He explained that it is necessary to coin some expression conveying to the public the understanding that the product is of inferior quality but not deficient in food value, and that there is no provision under the law that can take it off the market. Mr. Campbell also pointed out that if a can appears on the market bearing the mere statement "Below U. S. Standard," some portion of the public may infer that the Food and Drugs Act has broken down.

F. M. Shook, field secretary of Tri-State, and H. R. Burr, executive secretary of the Wisconsin Canners' Association, suggested that if the words "Below U. S. Standard" are not regarded as sufficient, the qualifying statement should be of a negative rather than an affirmative character. Instead of "Legal-Wholesome" they suggested that the label should read "Not Unwholesome—Not Illegal," or that some other phrase be used expressive of the proper shade of meaning.

With reference to the standards to be set up under the Mapes Act, canners urged that instead of the method proposed by the department, the scoring system be employed. They urged that canners throughout the country not only are familiar with this system but that it would be more fair in its application than the precision method proposed by the department.

Dr. W. B. White, chief of food control, explained that the standards proposed are so low that if a can falls down in one respect, a high score on other characteristics would not be sufficient to bring its average up to the proper grade, even by the score sheet method. Mr. Campbell stated that he had no prejudice against weighing the various factors on the basis of a score, but he pointed out that as the Food and Drugs Act is a criminal statute, the standards can be enforced effectively only if they

Tentative Standard for Canned Peas

1. The "canned food" known as peas consists of the tender, immature, fresh, unbroken seed of the common or garden variety pea (Pisum sativum), with or without seasoning (sugar, salt), and with added potable water in such proportion that when the contents of the can are poured into another container and returned to the can, standing on a level surface, and the peas leveled with a spoon without downward pressure, the liquor does not more than cover the peas. In no case, however, shall the proportion of liquor, as determined by draining two minutes on a U. S. standard No. 8 sieve,* be less than 20 per cent by weight of the contents of the can. The product is free from abnormal flavors, colors, and extraneous material, except that it may contain broken pieces of pea seed, loose skins, discolored peas, hard or firm peas, within the following limits:

Loose skins and broken peas combined—not more than 15 per ounce of drained peas.

Discolored peas, such as brown or brown spotted peas—not more than three per ounce of drained peas.

Hard peas—not more than 5 per cent by count.

Firm peas—not more than 40 per cent by count.

2. The seed shall be considered as unbroken if the two cotyledons are still held together by the skin, even though the cotyledons may be cracked or partially crushed or the skin split.

3. To determine tenderness the following method is used: Remove the skin of the pea and place one cotyledon on its flat surface on a horizontal, smooth plate. By means of a second horizontal, smooth plate apply vertically an initial load of 100 grams and increase the load at a uniform, continuous rate of twelve grams per second until the cotyledon is compressed to one-fourth its original thickness. Any pea requiring 500 or more grams is considered firm, and any pea requiring 1,000 or more grams is also considered hard.

4. The product occupies not less than 90 per cent of the total capacity of the closed container.

*The diameter of the wire is 0.0331 in. and the openings are 0.0937 in. in a standard No. 8 sieve. For containers up to 3 lb. net weight and 8-in. diameter, and for larger sized containers a 12-in. diameter sieve is used.

Tentative Standard for Canned Pears

1. The class of "canned food" known collectively as pears consists of the normal sized, tender, peeled and stemmed, mature, fresh fruit* of the pear tree, with blossom end and, except when pears are packed whole, seed cells removed, and with or without the fibrous material connecting the stem with the seed cells, together with sugar solution in such proportion that when drained for two minutes on a U. S. standard No. 8 sieve† not less than 65 per cent nor more than 80 per cent of the total net weight shall be retained on the screen. The solution which drains through the screen shall read not less than 14 deg. nor more than 40 deg. Brix (read at the proper temperature for the instrument used). The product is free from abnormal flavors, color, and excessively trimmed pieces. Trimming shall be considered excessive when more than one-third of the unit has been removed so as to destroy its normal contour. Not over 25 per cent of the units contain blemishes, and no unit contains blemishes in excess of 5 per cent of its total exposed area. No unit is less than three-quarters of an ounce in weight and the units are sufficiently uniform in size so that the combined length and maximum width of the largest is not more than 1¼ times the combined length and width of the smallest. All units are unbroken and have the same general contour.

2. The units are sufficiently firm so that after draining on the screen they remain separate and retain their approximate shape, but are free from gritty portions and sufficiently tender so that not less than 90 per cent by count are completely perforated by an untapered needle, $\frac{1}{32}$ in. in diameter, under a load of 300 grams, applied vertically to the exposed peeled surface of a test piece carefully fitted into an appropriate holder. In performing this test, the needle is placed on the exposed surface under an initial load of 100 grams and the load increased at a uniform, continuous rate of 12 grams per second until the piece is perforated. A convenient method of obtaining the test piece is as follows: Using a cylinder of approximately 1⅛ in. diameter, made of sheet metal approximately $\frac{1}{32}$ in. thick, cut a core from the fruit completely through from the inner surface to the peeled surface, so that the peeled surface is exposed when the cylinder retaining this core is firmly supported on a horizontal, smooth plate.

3. The product occupies not less than 90 per cent of the total capacity of the closed container.

*The fruit is usually packed in one of the following styles: halves, commonly known as "pears"; whole, commonly known as "whole pears."

†The diameter of the wire is 0.0331 in. and the openings are 0.0937 in. in a standard No. 8 sieve. For containers up to 3 lb. net weight an 8-in. diameter, and for larger sized containers a diameter, sieve is used.

are predicated upon certain definite physical properties susceptible to classification. The enforcement officials said that it would not be necessary for canners to install the apparatus that is used in defining the standards, as every precise test that must be used to satisfy the courts has an equivalent rule-of-thumb test that can be applied in factory operations. Consideration will be given to co-ordinating the department's tentative method with the usual scoring system at the meeting of the National Canners' Association.

Tentative Standard for Canned Peaches

1. The class of "canned food" known collectively as canned peaches consists of the normal sized, tender, peeled, mature, fresh, and, except when packed whole, pitted fruit* of the peach tree, with sugar solution in such proportion that when drained two minutes on a U. S. standard No. 8 sieve† not less than 65 per cent nor more than 80 per cent of the total net weight is retained on the sieve. The solution which drains through the sieve reads not less than 14 deg. nor more than 40 deg. Brix (read at the proper temperature for the instrument used). The product is free from abnormal flavors, colors, and excessively trimmed pieces. Trimming shall be considered excessive when more than one-third of the unit has been removed so as to destroy its normal contour. Not over 25 per cent of the units contain blemishes, and no unit contains blemishes in excess of 5 per cent of its total exposed area. No unit is less than one-tenth ounce in weight and the units are sufficiently uniform in size so that the maximum dimension of the largest is not more than 1½ times that of the smallest. All units are unbroken and have the same general contour.

2. A peach is considered of normal size when a pitted half weighs 1 oz. or more after drainage on the above sieve.

3. The units are sufficiently firm so that after draining on the sieve they remain separate and retain their approximate shape, but are sufficiently tender so that not less than 90 per cent by count will be completely perforated by an untapered needle, 1/32 in. in diameter, under a load of 300 grams, applied vertically to the exposed peeled surface of a test piece carefully fitted into an appropriate holder. In performing this test the needle is placed on the exposed surface under an initial load of 100 grams and the load increased at a uniform, continuous rate of 12 grams per second until the piece is perforated. A convenient method of obtaining the test piece is as follows: Using a cylinder of approximately 1⅛ in. diameter, made of sheet metal approximately 1/32 in. thick, cut a core from the fruit completely through from the inner surface to the peeled surface, so that the peeled surface is exposed when the cylinder retaining this core is firmly supported on a horizontal, smooth plate. In determining tenderness in the case of sliced peaches, when the units are not sufficiently large to admit the obtaining of a test piece in the manner above suggested, a V-shaped metal trough, 1 in. long, ⅜ in. wide, and ¾ in. deep, with vertical ends, is a convenient holder.

4. The product occupies not less than 90 per cent of the total capacity of the closed container.

*The fruit is usually packed in one of the following styles: halves, commonly known as "peaches"; sliced, commonly known as "sliced peaches"; whole, commonly known as "whole peaches."

†The diameter of the wire is 0.0331 in. and the openings are 0.0937 in. In a standard No. 8 sieve. For containers up to 3 lb. net weight an 8-in. diameter, and for larger sizes a 12-in. diameter, sieve is used.

Food Refrigeration Emphasized as Refrigerating Engineers Meet

INTEREST in the "Food and Refrigeration" program at the convention of the American Society of Refrigerating Engineers, held in New York Dec. 3-6, testified to the increasing importance of this branch of the industry.

Frank Zumbro, research engineer of the Frick Company, told of the refrigeration problems met in the freezing of Georgia peaches. He described a combination CO_2-ammonia system used to give the necessary refrigeration of air at —35 deg. F. or below for freezing the peaches. About 0.024 ton of refrigeration per pound per hour is necessary for the freezing, he pointed out. Mr. Zumbro also described equipment in which air at —35 deg. F. is circulated through tunnels at a rate of 710 ft. per minute for the quick-hardening of ice cream in individual containers. From 45 to 60 min. is necessary for pint packages.

W. R. Woolrich of the University of Tennessee, gave further evidence to support his previously announced conclusion that latent heat of foods is in all cases directly proportional to the water content. He pointed out, however, that many foods have no clearly defined freezing point, but freeze gradually through a range of temperatures below that of pure water as the concentration of salts increases. This makes it well nigh impossible to secure accurate latent heat figures.

The theory of cell breakdown during freezing, according to Paul Willer Petersen, still contains many unknown factors. He held that bursting of the cells due to osmotic action is an important reason for the deterioration which accompanies slow freezing.

The use of ozone in the preservation of cold-storage foods was discussed by Arthur W. Ewell, professor of physics at Worcester Polytechnic Institute. He presented quantitative data on the absorption of ozone by vegetables.

A. R. Fayed, Purdue University, presented a student research paper on bakery refrigeration. He traced the refrigeration and air-conditioning needs of the various plant operations and discussed the advisability of using cooled water at 33 deg. F. rather than brine or direct expansion for fulfilling them.

Necessity for controlling the humidity, circulation, and purity of air in cold-storage rooms, as well as its temperature, was stressed by Milton W. Browne, of Kansas City, Mo. This can be achieved only by properly designed forced-air circulation, he contended.

Alvin H. Baer, of the Frick Company, Waynesboro, Pa., was elected president of the organization to succeed Harry D. Edwards. Other new officers elected were Alfred W. Oakley, vice-president; Harry Harrison, treasurer, and the following directors: C. Thomas Baker, Atlanta, Ga.; Charles W. Berry, Cambridge, Mass.; Clarence Birdseye, Gloucester, Mass.; Eugene M. Dodds, Kansas City, Mo.; Robert T. Frazier, Chattanooga, Tenn. Glenn Muffly continues as vice-president, and David L. Fiske remains as secretary.

Sugar Restriction a Failure Unless Germans Reconsider

SUCCESS of the world sugar restriction conference, generally regarded as the most notable attempt to solve a world-wide overproduction problem ever made, hangs in the balance with further action on the part of Germany as the determining factor. The conference at Brussels adjourned on Dec. 16 after the six other delegations involved signed a provisional agreement to meet the terms proposed by Thomas L. Chadbourne should Germany reconsider her decision. German delegates had brought the negotiations to an end on Dec. 15, when they refused to accept the export quota of 200,000 tons laid down for them in the plan, and asked to export 350,000 tons each year of the plan, with 100,000 tons extra the first year. In an ultimatum to the conference, they definitely refused to make further concessions and left for home at once. Chances for reconsideration are said to be "fair," as a counter-proposal which may mean further arbitration has been submitted by the German interests.

Stating that overproduction of sugar, as well as other commodities, offered a challenge to sane economic laws which was testing capitalism itself, Mr. Chadbourne, who heads the Cuban-American group, pleaded for mutual sacrifices at the opening of the parley. "The sugar industry is not alone in suffering from the selfish greed of its constituent parts, greed which has so far overreached itself in our industry as to leave Cuba with 1,500,000 tons excess sugar, Java with 500,000 tons, and Europe with 1,200,000 tons," Mr. Chadbourne contended.

A number of other disagreements which appeared to offer insurmountable obstacles to the plan had been eliminated by the group, or at the plenary session in Amsterdam, previous to the breakdown. It was generally recognized that Germany would have to make the greatest sacrifice of any European nation, all of whom were asked to reduce exports 15 per cent, because it now has an export surplus of 812,000 tons. To dispose of one-fifth of this surplus in each of the five years of the plan, and at the same time to keep the total exported within 200,000 tons, would mean a yearly export of new sugar of but 38,000 tons. Although drastic, this reduction does not equal that contemplated by Cuban interests, who are willing to restrict next year's crop by 1,100,000 tons.

TRADE NOTES

ANHEUSER-BUSCH, INC., have purchased nineteen acres of land in Middlesex County, N. J., on which to erect a plant for the manufacture of yeast. E. C. Nicolait, Eastern manager for the company, said the plant would be one of the largest, if not the largest, in the country.

CAMPBELL SOUP COMPANY, LTD., Toronto, Canada, has been formed with a capital of $2,000,000. The company is a subsidiary of the Campbell Soup Company, Camden, N. J. It has arranged to purchase 15 acres of land in New Toronto, a suburb of the city, where it will establish a plant and executive offices from which products will be distributed to the Canadian trade.

CHALLENGE CREAM AND BUTTER ASSOCIATION, Los Angeles, Calif.; United Dairymen's Association of Washington; and Interstate Dairymen's Association of Oregon have recently merged.

CRESCENT LIME & MARBLE COMPANY, Pearl and Valley City, Ill., is planning the manufacture of solid carbon dioxide operated in connection with lime kilns. A capacity of more than 20 tons a day is contemplated.

CUDAHY PACKING COMPANY, Chicago, Ill., celebrated the 40th anniversary of its founding during the week of Dec. 15.

DAIRY AND ICE CREAM MACHINERY & SUPPLIES ASSOCIATION has announced that the Dairy Industries Exposition in 1931 will be held at Atlantic City, N. J., from Oct. 26 to 31 inclusive.

DOMINION SUGAR COMPANY, Toronto, Canada, and CANADA SUGAR REFINING COMPANY, Montreal, have both notified shareholders that a meeting will be held to discuss sale of the company. Reports indicate that the companies may be merged with the Atlantic Sugar Company. The St. Lawrence Sugar Company is also mentioned as a possible factor in the negotiations.

GENERAL FOODS CORPORATION has purchased the Atlantic Gelatine Company through the newly created Atlantic Gelatin Company, Inc., a wholly owned subsidiary of General Foods. The Atlantic Gelatin Company, located at Woburn, Mass., is one of the largest manufacturers of edible gelatin. It becomes the thirty-first producing organization in the General Foods group.

ADOLF GOBEL, INC., meat product manufacturer, of New York City, has inaugurated an anti-prohibition advertising campaign in which it is announced that a percentage of the company's profits will be donated to the anti-prohibition movement.

JUNE DAIRY PRODUCTS COMPANY, New York City, has purchased William M. Lippincott & Company, wholesale butter dealers of Philadelphia, Pa. William M. Lippincott will continue as president and manager.

KRAFT-PHENIX CHEESE CORPORATION formally opened its $250,000 plant at Atlanta, Ga., on Dec. 15. The new plant will take over operations of the present local plant in the near future.

KROGER GROCERY & BAKING COMPANY is planning to adopt a "thirteen-month" calendar on Jan. 5. Reports after that date will be issued for a period of four weeks, or 28 days each. Every six or seventh year the extra days occasioned by the one day more than thirteen periods of 28 days in the ordinary year, and the extra day in leap year will be combined to form an extra week.

MILLER & MCKELVEY, INC., 60 East 42d St., New York City, have recently been organized to act as sales engineers for a number of food manufacturing equipment organizations, particularly for bakery and confectionery products. Arthur F. Miller, president, was formerly with Baker-Perkins Company and with John Werner & Sons. David M. McKelvey has been consulting engineer and manager of the engineering department of National Biscuit Company.

MOXIE COMPANY, MOXIE COMPANY OF AMERICA and PUREOXIA COMPANY are contemplating a merger under the Moxie Company name. Stockholders of Moxie Company and Pureoxia Company have already approved the plans.

NATIONAL BISCUIT COMPANY recently purchased the T. A. Huston & Company, Maine cracker manufacturers.

NATIONAL BISCUIT COMPANY has been awarded a decision by the Court of Customs and Patent Appeals, which prevents registration of the trademark "American Beauty" by Joseph W. Sheridan, for use on ice cream cones. The Commissioner of Patents had previously ruled that the use of the mark by National Biscuit Company did not prevent registration by Mr. Sheridan. In reversing the decision, the court held that such registration would lead to confusion, because of the similarity between ice cream cones and present bakery products manufactured by National Biscuit Company which bear "American Beauty" as a trademark.

NATIONAL DAIRY PRODUCTS CORPORATION has acquired the Fairfield-Western Maryland Dairy, of Baltimore, Md., it was announced on Dec. 11.

PURE CITRUS FRUIT JUICE CORPORATION was issued a New York state charter of incorporation a few days ago. The capitalization was 100 shares of no-par common stock. The papers were filed by Kramer, Burke & Galgano, 130 West 42d St., New York City.

WILLIAMSON CANDY COMPANY, manufacturer of the well-known "Oh Henry" and "Amos 'n Andy" candy bars, is contributing 10 per cent of its gross sales during December for charitable relief work, according to a recent announcement.

Food Business Steady Despite Price Decline

FURTHER decline in wholesale prices of all commodities during the month of November disappointed all who thought that Nov. 1 had seen a turn for the better. The decline in wholesale prices of food was 3¼ per cent, in comparison with 2½ per cent decline for all commodities. Retail food prices showed an average decrease of 2 per cent during the month, in contrast with 0.9 per cent during the month of October.

This decline in food prices as compared with that of other commodities was not duplicated in employment statistics. The general index of all manufacturing industries shows a 2.1 per cent decrease in employee personnel and 4.4 per cent decrease in payroll evaluation during November, whereas the food industries show a decrease of 1.2 per cent in personnel and 1.9 per cent in payroll.

The index of general business conditions of *The Business Week* for the last week of December is 76 per cent of normal, in comparison with 81 per cent for the same week in November, as reported in December issue of FOOD INDUSTRIES.

All of this looks discouraging, but when one considers that *The Business Week* index has been almost constant since the middle of December and that the sales records of the food business have been approximately normal in volume, we may be justified in concluding that the decline in prices has had a greater effect on public psychology than on fundamental business factors.

PERSONALS

ROBERT O. BENGIS, of New Haven, Conn., has been appointed to the Chase & Sanborn Research Fellowship, which Standard Brands, Inc., recently established at Yale University for the investigation of the chemical changes that occur in coffee as it ages. Dr. Bengis will carry out his studies at the Sterling Chemistry Laboratory in New Haven.

D. A. CAMPBELL, Toronto, Canada, has been made a member of the board of directors of the St. Lawrence Flour Mills Company, Ltd., of Montreal, Quebec. Mr. Campbell has been prominent in Canadian milling circles for some time.

ALVIN E. DODD, formerly assistant to the president of Sears, Roebuck & Company, has resigned to become assistant to Albert H. Morrill, president of the Kroger Grocery & Baking Company, Cincinnati, Ohio. As the first director of the Retail Research Association, Mr.

Dodd began the first scientific study of retail store management.

VICTOR M. EKDAHL, of Swift & Company, has been made general manager of the refinery operations on the Pacific Coast, it was recently announced. Mr. Ekdahl went to California about a year ago, having formerly been sales manager in Omaha, Neb.; Chicago, Ill.; and in Canada.

S. P. HARTER, of San Francisco, general sales manager of the Pacific Coast Division of the Sego Milk Products Company, has been elected vice-president and general manager of that company. He succeeds Roy Bullen, who died a short time ago. Mr. Harter has been associated with the Sego Company for nearly five years.

CHARLES F. HAUG has been elected president of the New York State Association of Confectionery and Chocolate Manufacturers. Mr. Haug, who heads the Mason, Au & Magenheimer Confectionery Manufacturing Company, succeeds the late Henry A. Fehn, president of the group.

JOSEPH F. LEETE, formerly research chemist and assistant chemical director of the Spreckles Sugar Corporation, has joined the staff of the Applied Sugar Laboratories of New York City. Dr. Leete was also formerly head of the department of chemistry in the American University of Cairo, Egypt, where he did research on bacterial fermentation of sugars. He did considerable research on sugars and sugar derivatives in the Greifswald University in Germany. MISS KATHRYN LANGWILL, formerly junior chemist in the food and drug division of the Massachusetts Department of Public Health, has also joined the staff of Applied Sugar Laboratories. During the spring and summer of 1930 she was employed by the New York Eskimo Pie Corporation as assistant chemist.

B. I. MASUROVSKY, technical director for Coignet Gelatines, will extend his activities in consulting capacity to the dairy and ice cream industries, it was announced on Dec. 11. Mr. Masurovsky was formerly dairy inspector at Nebraska State University.

J. P. MCKENNEY, Minneapolis, Minn., was elected president of the Pillsbury-Astoria Flour Mills, Astoria, Ore., on Nov. 19 to succeed Edgar W. Smith. Mr. McKenney has been in the parent Pillsbury Company in Minneapolis for some time. THEODORE BROWN, head miller at the Astoria plant, was elected a member of the board of directors of the Pillsbury-Astoria organization.

GEORGE L. MCMUNN was made active head of Sweets Company of America at a recent meeting of the board of directors. Mr. McMunn was elected vice-president and secretary, the office of president, formerly held by the late Henry A. Fehn, being left unfilled.

A. M. MULLENS has been elected vice-president of the Runkel Bros., Inc., New York City. Mr. Mullens has been general sales director of the organization since January, 1929, having previously been manager of the Chicago branch.

JOHN B. NEWMAN, Elgin, Ill., has resigned his position as special representative for the Royal Baking Powder Company, subsidiary of Standard Brands, Inc. His resignation becomes effective Jan. 1. Mr. Newman has not yet made definite plans for the future. Before joining the Royal Baking Powder Company, he was State Food Commissioner of Illinois. He also has served as field secretary of the National Wholesale Grocers' Association.

J. B. PORTER, Tulsa, Okla., was elected president of the Southern Association of Ice Cream Manufacturers at their recent convention in Birmingham, Ala.

A. B. SCOTT of Mather, Wis., has been elected president of the Wisconsin Cranberry Growers' Association.

JORDAN STEWART, formerly vice-president and general manager, has been elected president of Park & Tilford, Inc., succeeding David A. Schulte, who becomes chairman of the board of directors. Mr. Stewart had been vice-president and general manager of the company since 1926. DEWITT COTTRELL, formerly purchasing agent for the Happiness Candy Stores, Inc., has been made head of the creating and designing department of Park & Tilford.

DAYTON F. WHITNEY has resigned as president of the Kraft-Phenix Cheese Corporation, and will be succeeded by J. L. KRAFT, now chairman of the board of directors. The position of chairman of the board will be abolished.

ELMER F. WRIGHT has been made manager of the Wilson Baking Company at Clarksburg, W. Va. He succeeds W. E. Tompkins, who has been transferred to the plant of the Lee Baking Company of Winchester, Va. Both organizations are units of the Columbia Baking Company. W. F. DANNY, who had been in charge of the Winchester plant, has resigned to enter private business.

OBITUARY

ROY BULLEN, vice-president and general manager of the Sego Milk Products Company, died suddenly at his home in Salt Lake City, Utah, on Nov. 30. Mr. Bullen was also president and general manager of the Clover Leaf-Harris Dairy Company and the Western Creamery Company; president of the Coville Ice Cream Company, and a director of the Utah-Idaho Sugar Company and of the Pet Milk Company, St. Louis, Mo.

ALFRED H. BURT, prominent Buffalo (N. Y.) candy manufacturer, died on Dec. 7. He was 66 years of age.

RUBE FOSTER, of the Fisher Flour Mills, Seattle, Wash., and president of the Western Washington branch of the American Society of Bakery Engineers, died on Dec. 8.

MEYER LEHMANN, prominent in the Louisiana sugar industry for more than 50 years, died in New Orleans, La., on Dec. 22. He was 72 years of age.

CHARLES D. MIDDLEBROOK, vice-president of Wilson & Company, Chicago, Ill., died on Dec. 16 after a brief illness. He was 55 years of age and had been connected with the packing industry for 45 years. Mr. Middlebrook was one of the pioneers in developing international business in the meat packing industry. As a representative of Morris & Company, in 1897 he went to England and other parts of Europe to open branches. In 1912 he went to Argentina, where he spent ten years. He retired in 1922, only to be pressed into South American service once more after the Armour-Morris merger. He joined his life-long friend, Thomas E. Wilson, in the management of Wilson & Company in 1925.

MARTIN F. MILLER, formerly in the milling industry in Rochester, N. Y., died in that city on Dec. 16. He was 81 years old, having retired from active work a number of years ago.

FRANK H. MORNINGSTAR, president of the Hagerty Baking Company, Phillipsburg, Pa., died on Dec. 9 at the age of 51.

WILLIAM HENRY NEAL, founder and president of W. H. Neal & Sons, Inc., Hurlock, Md., died at his home on Dec. 14. He was 72 years of age.

WILLIS H. POST, formerly in charge of the export department of the Postum Cereal Company, General Foods Corporation subsidiary, died at Battle Creek, Mich., on Nov. 27. He was 76 years of age. Mr. Post was a cousin of Charles W. Post, founder of the Postum company.

PETER G. RUEHLMAN, president of the Ruehlman Flour Company, Cincinnati, Ohio, died on Dec. 16, after a prolonged illness. He founded the firm 60 years ago. Mr. Ruehlman served as Food Administrator in the Cincinnati area during the World War.

ROY C. SLOCUM, vice-president of the Coast-Dakota Flour Company, San Francisco, died on Nov. 25. Mr. Slocum was engaged in the milling business for some years in Minneapolis before going to the West Coast.

ERNEST E. SMITH, known for his research work on foods, died recently at the age of 62 at his home in Kew Gardens, N. Y. Thirty years ago, Dr. Smith opened one of the first private laboratories for research into the chemical properties of foods, in New York City. For a number of years he was consulting physiologist to the New York Health Department and served as president of the New York Academy of Sciences in 1918 and 1919. He had done a considerable amount of work on baking powder, and was the author of "Aluminum Compounds in Food" and other pamphlets and magazine articles.

NEW CONSTRUCTION

Abattoir Building — Insel Bros. Co., 835 South 14th St., Newark, N. J., will build a 2 story, 100 x 150 ft. abattoir building at 225 Pacific St. Estimated cost $40,000. Private plans. Work will be done by separate contracts.

Bakery—Butter Nut Bread Co., Texarkana, Ark., postponed indefinitely construction of 2 story, 73 x 135 ft. bakery at 10th and State Line. Estimated cost $50,000. Witt, Seibert & Halsey, Texarkana National Bank Bldg., are architects.

Bakery—Clairton Baking Co., State St., Clairton, Pa., awarded contract for a 1 story, 54 x 107 ft. bakery to N. LeDonne, 539 8th St., Clairton. Estimated cost $40,000.

Bakery—El Fenix Bakery, c/o J. Estrada, 110 South Laredo St., San Antonio, Tex., acquired a site and plans the construction of a 43 x 110 ft. bakery. Estimated cost $100,000. Machinery and equipment will be required.

Bakery—Highland Bakery Co., 1733 Ponce de Leon Ave., Atlanta, Ga., awarded contract for a 1 story bakery on Highland Ave. to Straiton Hard, 289 Pinetree St., Atlanta. Estimated cost $10,000.

Bakery—G. F. Stuhmer & Co., 570 7th Ave., New York, N. Y., awarded contract for the construction of a bakery and storage building at Park Ave. and Taaffe Pl., Brooklyn, to Sobray-Whitcomb, 105 West 40th St., New York. Estimated cost $40,000.

Bottling Plant—Coca Cola Bottling Co., Cuthbert, Ga., received lowest bid for the construction of a 1 and 2 story, 82 x 53 ft. bottling plant from J. T. Ragan & Co., Vidalia.

Bottling Plant—Ozarka Water Co., 215 South Washington St., Wichita, Kan., awarded contract for a 1 story, 50 x 107 ft. bottling plant at First and Washington Sts., to C. N. Startzman, 405 North Spruce St., Wichita.

Bottling and Distribution Plants — Six Hundred Thirty Five West 54th St. Corp., c/o G. R. Davis, 12 East 41st St., New York, N. Y., Contr., awarded contract for the construction of bottling and distribution plants at 630 West 55th St. G. B. Seely's Son, 319 West 15th St., New York, lessee.

Brewery and Ice Manufacturing Plant—Rubsam & Harrman Brewing Co., Stapleton, S. I., N. Y., awarded contract for the construction of a brewery and ice manufacturing plant at 191 Canal St. to J. McDermott, Stapleton. Estimated cost to exceed $40,000.

Canning Plant—Riverside Canning Co., W. C. Mudge, 68 West Flagler St., Miami, Fla., plans the construction of a canning plant. Estimated cost $100,000.

Canning Plant (Citrus and Vegetable)—A. Carron, La Feria, Tex., awarded contract for a 1 story citrus and vegetable canning plant, including steam canning equipment, etc., to W. A. Strickland, La Feria. Estimated cost $15,000.

Lemon Storage Building — College Heights Orange & Lemon Association, Ontario, Calif., awarded contract for a 2 story, 60 x 148 ft. lemon storage building at Claremont, to C. T. Stover, 425 Armsley Sq., Ontario. Estimated cost $35,000.

Creamery Plant—Corliss Creamery Co., N. L. Sappie, Prop., 1762 West Carson St., Pittsburgh, Pa., is having plans prepared for the construction of a 2 story, 98 x 160 ft. creamery plant on Reedsdale St. Braziell & Anderson, 309 4th Ave., Pittsburgh, are architects.

Creamery Plant—Crescent Valley Creamery, c/o J. E. Wayne, Cuero, Tex., awarded contract for the construction of a 1 story, 33 x 80 ft. creamery plant including cold storage facilities to J. C. Young, Cuero. Estimated cost $25,000.

Creamery — North American Creamery Co., Oakes, N. D., plans the construction of a 2 story, 65 x 140 ft. creamery at Valley City. Estimated cost $100,000. M. O. Buetow, 1380 Blair St., St. Paul, Minn., is architect.

Dairy Plant—Hubbell & Baker, Knoxville Rd., R. F. D., Peoria, Ill., awarded contract for the construction of a 1 story, 80 x 135 ft. dairy plant including refrigeration system, boiler room, etc., on University St., to F. Harbers Son, Central Bank Bldg., Peoria. Estimated cost $40,000.

Dairy Plant Addition—Youngstown Sanitary Milk Co., 715 Erie St., Youngstown, O., awarded contract for the construction of a 2 story dairy plant to E. T. Linberger, 830 Market St., Youngstown. Estimated cost $150,000.

Dairy Products Plant — Guadalupe Dairy Stores, c/o T. N. Weaver, 638 Main Ave., San Antonio, Tex., plans the construction of a dairy products plant. Machinery and equipment to cost $50,000 will be required.

Ice Cream Plant—Samarkand Ice Cream Co., 893 Folsom St., San Francisco, Calif., awarded contract for a 1 story ice cream plant at 18th and Peralta St., Oakland to Cahill Bros., 206 Sansome St., San Francisco. $45,000.

Ice Cream Plant Addition — Atlantic Ice Cream Co., 899 Eastern Ave., Melrose, Mass., awarded contract for addition and alterations to ice cream plant at Malden to Lucia Bros., 47 Cushing St., Medford. Estimated cost $40,000.

Milk Plant—Douthitt Engineering Co., 100 West Monroe St., Chicago, Ill., is having plans prepared for the construction of a dried milk plant at Clinton, Okla. Estimated cost $60,000. R. M. McCool, Clinton, is engineer.

Milk Plant—Meyenberg Inc., Soledad, Calif., awarded contract for the construction of a group of buildings for evaporated milk plant at Ripon, Calif., to H. H. Larsen & Co., 64 South Park, San Francisco. Estimated cost $200,000.

Milk Distribution Plant—Sheffield Farms Co., Inc., 524 West 57th St., New York, N. Y., will receive bids after Jan. 15 for the construction of a milk distribution plant at Jersey City, N. J. Estimaetd cost to exceed $100,000.

Cold Storage Plant—Louisiana Ice & Coal Co., C. H. Free, Mgr., 1121 Julia St., New Orleans, La., will soon award contract for a 1 story, 35 x 56 ft. addition to cold storage plant at Westwego.

Ice Plant—T. B. Buck, 2012 Talbotton Ave., Columbus, Ga., plans the construction of a 1 story ice plant at Macon.

Ice Plant—E. A. Clausnitzer, Taylor, Tex., awarded contract for a 40-ton ice plant to W. Sippel, New Braunfels. Estimated cost $18,000. Equipment contract let.

Ice Plant—Garfield Crystal Ice Co., Midland Ave., Garfield, N. J., awarded contract for a 2 story ice plant at Midland Ave. and Charles St. to Mahony-Trodst Construction Co., 657 Main St., Passaic. Estimated cost $75,000.

Ice Plant—Pure Ice & Cold Storage Co., Lake Charles, La., awarded foundation and building contract for 1 story, 44 x 82 ft. ice plant, to Bailey & Brewer, Pineville, $26,328; ice machinery contract to York Ice Machinery Corp., 609 Tchoupitoulas St., New Orleans, $11,543.

Ice Manufacturing Plant—Supreme Coal & Ice Co., L. Tarielli, Pres., 551 Nostrand Ave., Brooklyn, N. Y., plans an ice manufacturing plant at Lexington Ave. and Marcy St. Estimated cost $75,000. Bly & Hamann, 551 Nostrand Ave., Brooklyn, are architects.

Refrigerating Units — City of San Antonio, Tex., c/o J. Rubiola, Comr., awarded contract for the installation of seventeen refrigerating units for Market house to E. Friedrich, East Commerce St., San Antonio.

Plant — A. C. Terwilliger, 418 Washington Ave., Titusville, Fla., awarded contract for the construction of a plant for handling frozen fruit, to G. W. Matthews & Co., Titusville. Estimated cost $45,000.

Cider and Vinegar Plant — W. E. Mathews Cider & Vinegar Co., M. Buckley, Albion, N. Y., plans to rebuild plant recently destroyed by fire. Loss $300,000.

Coffee Plant—Hoosier Coffee Co., 1417 Southeastern Ave., Indianapolis, Ind., awarded contract for the construction of a coffee plant to Ostrom Realty & Construction Co., 701 Peoples Bank Bldg., Indianapolis. Estimated cost $25,000.

Egg Candling Plant—Midvale Poultrymen's Association, H. Grass, Pres., Midvale, Utah, has work under way on the construction of an egg candling plant. Estimated cost $27,000. Work being done by day labor.

Grocery Warehouse—Eagle Grocery Co., c/o R. W. Sailer, 76 Montgomery St., Jersey City, N. J., Archt., awarded contract for a 1 story, 60 x 100 ft. addition to warehouse at First and Provost Sts., to Hudson Concrete Construction Co., 454 Montgomery St., Jersey City. Estimated cost $40,000.

Grocery Warehouse—Ballinger & Co., 12th and Chestnut Sts., Philadelphia, Pa., will receive bids about Jan. 15 for the construction of a 1 story warehouse at Fayeth and Read Sts., Perth Amboy, N. J., for Greenspan Bros., 226 Washington St., Perth Amboy. Estimated cost $150,000.

Lime and Dry Ice Plant—California Lime & Products Co., R. L. Hollingsworth, Gen. Mgr., Lincoln, Calif., is having plans prepared for a 200 ton lime plant and 50 ton dry ice plant at Antelope. Estimated cost $500,000. Smith-Emery Co., 651 Howard St., San Francisco, are engineers.

Market Building—Gore Bros., Film Exchange Bldg., Los Angeles, Calif., awarded contract for a 1 and 2 story, 125 x 176 ft. market building on Beverly Dr., to Perkinson Co., 3977 South Vermont Ave., Los Angeles. Estimated cost $150,000.

Refinery (Sugar)—United Fruit Co., Federal St., Boston, Mass., plans the construction of a cane sugar refinery at Kingston, Jamaica, West Indies. Estimated cost $500,000. Maturity indefinite.

Yeast Factory—Anheuser-Busch Inc., c/o A. A. Busch, Pres., 721 Pestalozzi St., St. Louis, Mo., acquired a site and plans the construction of a 7 or 8 story yeast factory, 100,000 lb. daily capacity, including garage, machine shop and power plant, at East Brunswick, N. J. Estimated cost $2,000,000. Owner is considering a similar plant to be located in some Western city, not yet decided on.

Grist Mill—Magloire Martel, Granby, Que., plans the construction of a grist mill on Main St. Estimated cost $20,000.

Packing Plant (Meat)—Glauser Meat Co., A. Glauser, Pres., 2130 Market St., St. Louis, Mo., will receive bids about Jan. 15 for the construction of a packing plant, cooler building and warehouse at 704-706 South Spring Ave. Aegerter & Bailey, 1904 Railway Exchange Bldg., St. Louis, are architects.

Packing Plant (Meat)—Karl Kreinberg and W. A. Krasny, 3310 West 65th St., Cleveland, O., awarded contract for a 1 story, 40 x 150 ft. cooler building to Tepper & Limovitz, 3468 East 123rd St., Cleveland. Estimated cost $50,000.

Packing Plant (Meat)—John Morrell & Co., Ottumwa, Ia., plans the construction of a meat packing plant at Nogales, Mexico. Estimated cost to exceed $40,000.

Packing Plant (Meat)—Swift & Co., c/o Union Stock Yards, Chicago, Ill., awarded contract for a 2 story meat packing plant, including refrigeration system, etc., at Cuero, Tex., to Johnson Construction Co., Waco, Tex. Estimated total cost $75,000.

Packing Plant—Armour & Co., Union Stock Yards, Chicago, Ill., plans the construction of a distribution plant on Seneca St., Oil City, Pa. R. C. Clark, c/o owner, is architect. Maturity indefinite.

Poultry Warehouse — Poultry Producers of Central California, 700 Front St., San Francisco, Calif., is receiving bids for the construction of a 3 story warehouse on Sansome St. Estimated cost $150,000. H. C. Baumann, 251 Kearny St., San Francisco, is architect.

Packing Plant (Citrus and Vegetable) — Southern Pacific Co., 65 Market St., San Francisco, Calif., awarded contract for a citrus and vegetable packing plant at Edinburg, Tex., to H. E. Tewell, Edinburg. Estimated cost $18,000. Private plans.

Packing Plant—Banfield Bros. Packing Co., 915 East Apache St., Tulsa, Okla., is having plans prepared for the construction of a 1 story packing plant at Fort Smith, Ark. Estimated cost $70,000. Bonnell-Tohtz Co., 1515 North Grand Blvd., St. Louis, Mo., are architects.

Packing Plant—Cleveland Provision Co., H. A. Schanz, Pres., 2527 Canal Rd., Cleveland, O., will soon award contract for a 2 story packing plant, 3378 West 65th St. Estimated cost $250,000. Peter Henschein, 59 East Van Buren St., Chicago, Ill., is architect.

Packing Plant Addition—McArthur Packing Co., Hutchinson, Kan., awarded contract for addition to and remodeling of packing plant, to Stamey Construction Co., Stamey Hotel Bldg., Hutchinson. Estimated cost $40,000.

Packing Plant—L. E. Walker, Klamath Falls, Ore., plans to rebuild packing plant on Midland Rd., destroyed by fire. Estimated cost $50,000. Work will probably be done by day labor. Machinery and equipment will be required.

Packing Plant and Market Building—J. Remley Co., 1315 Hodiamont Ave., St. Louis, Mo., is having plans prepared for remodeling and rebuilding present factory building into meat packing plant, also construction of warehouse and large retail market building at Kienlen and St. Louis Aves., Wellston, Mo. Bonnell-Tohtz Co., 1515 North Grand Ave., St. Louis, are architects.

Why Are They Building Now?

—profits, of course

"Out to give better service . . . out for *better business*" is the incentive which has brought these aggressive concerns into action. Improved products, lower production costs, better service, new markets . . . are some of the advantages they are gaining by the building of new plants and warehouses.

And with building costs well below the past 10-year average, their building dollars are buying more . . . their investment has greater profit opportunities. See reference to the Austin Method opposite.

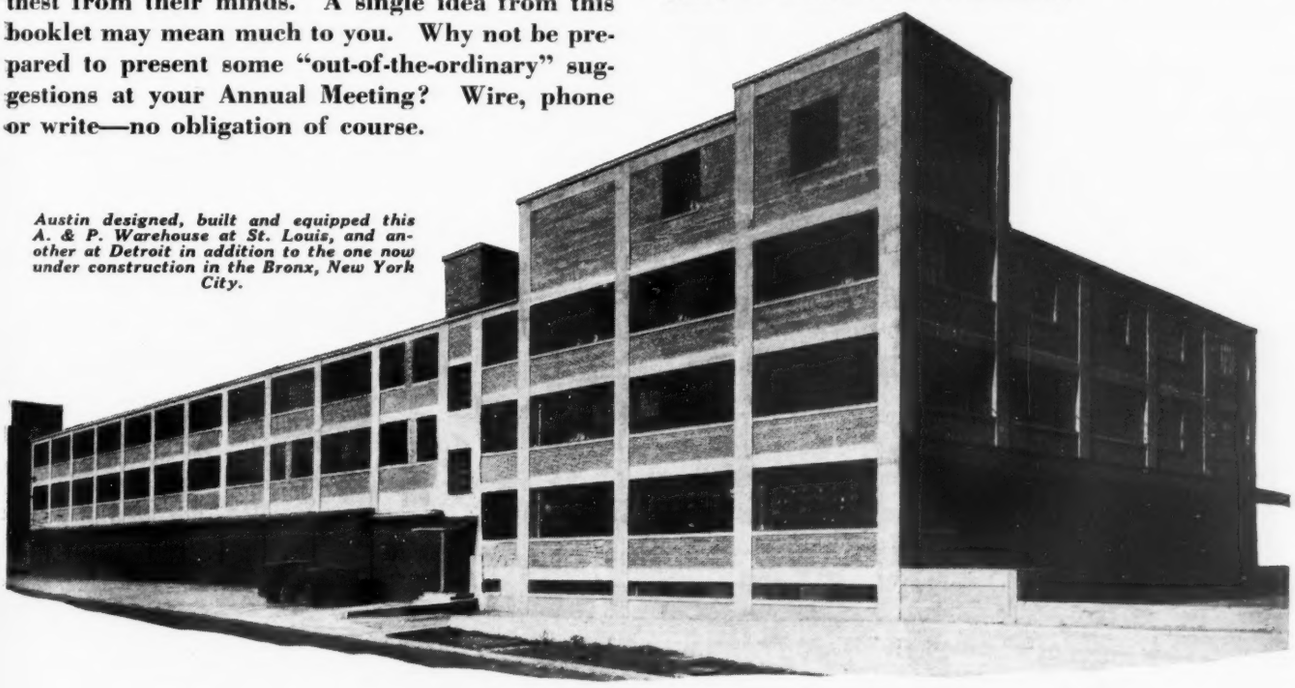
A new booklet, "101 QUESTIONS THAT SHOULD BE ANSWERED BEFORE YOU BUILD," intended primarily to help those about to build, raises questions the answers to which are important to many executives who have building operations farthest from their minds. A single idea from this booklet may mean much to you. Why not be prepared to present some "out-of-the-ordinary" suggestions at your Annual Meeting? Wire, phone or write—no obligation of course.

For these companies in the food industry, Austin has designed and construction work is *just completed* or *under way* today!

1. Atlantic & Pacific Tea Co., N. Y. City
2. Yakima Dairymen's Association, Yakima, Wash.
3. Mars Incorporated, Chicago.
4. The Dayton Biscuit Company, Cleveland.
5. Capitol Poultry Farms, Jefferson City, Mo.
6. Dairymen's Co-op. Creamery of Boise Valley, Caldwell, Idaho.
7. Lagendorf United Bakeries, Inc., San Francisco.
8. Cooperative G. L. P., Inc., Buffalo.
9. Tea Garden Products Company, San Francisco.

Austin Service Is Complete!

The Austin Method of Undivided Responsibility covers plant layout and design, architecture, construction and building equipment—under one contract by one organization. The contract guarantees in advance, low cost, completion date, with bonus and penalty clause if desired, high quality of material and workmanship.



Austin designed, built and equipped this A. & P. Warehouse at St. Louis, and another at Detroit in addition to the one now under construction in the Bronx, New York City.

THE AUSTIN COMPANY

Engineers and Builders Cleveland

NEW YORK CHICAGO PHILADELPHIA
PITTSBURGH BOSTON ST. LOUIS
NEWARK DETROIT CINCINNATI
SEATTLE PORTLAND

THE AUSTIN METHOD

THE AUSTIN COMPANY OF CALIFORNIA, LTD.:
LOS ANGELES, OAKLAND AND SAN FRANCISCO
THE AUSTIN COMPANY OF TEXAS: DALLAS
THE AUSTIN COMPANY, LIMITED, TORONTO AND VANCOUVER, (B. C.)

Memo to The Austin Company, Cleveland— ☐ You may send, marked for my personal attention, a copy of "101 Questions," without obligation. We are interested in a ..... project ..... sq. ft.

Individual ..... Firm ..... City F.I.1-31

for FROZEN FOODS . . . *what kind of insulation? how much is needed? how must it be installed?*

We'll help you with the answers

When you insulate for polar temperatures, call on Armstrong's Frozen Foods Committee for advice

WHAT method of quick freezing do you plan to use? Whatever the system is, it demands temperatures from 35 to 50 degrees below zero. Getting these polar temperatures is comparatively easy. Holding them requires adequate insulation, properly installed.

Armstrong's insulation engineers have a valuable background of experience covering all types of cold storage work. They are carrying out research and investigation in the field of insulation for quick freezing. Experiments are continually being made with every type of installation—new materials are being tried, new combinations tested.

Armstrong's experienced engineers will be glad to give you their recommendations on quick-freeze insulation. They have helped with the construction of a wide range of freezing rooms—in packing plants, fruit juice freezing plants, and many other types of installations. Now they offer you the benefit of this accumulated knowledge and experience. Whatever system your plan calls for, somewhere in their experience is an actual installation which fits your needs. It can supply the knowledge to make your equipment a success.

This service is free. It is yours for the asking. Just simply write to the Armstrong Cork & Insulation Company, 948 Concord Street, Lancaster, Pennsylvania.

Armstrong's (A) *Product*

When you plan insulation consider these points

1. Is the material efficient?

First of all, your insulation must stop the passage of heat. Among all insulating materials, Armstrong's Corkboard ranks with the leaders in heat transmission coefficient.

2. Is it moisture-proof?

Moisture in any form destroys insulating efficiency . . . and moisture is always present in low temperature work. Fibrous materials tend to absorb moisture. Cork is not fibrous—its tiny air-tight cells resist the entrance of dampness throughout years of service.

3. Is it strong?

Quick-freeze installations are heavy. The insulation must stand up under considerable strain. Choose a board that has structural strength to prevent cracking or warping. Armstrong's Corkboard has extra strength.

4. Is it fire-resisting?

The danger of fire in low temperature work is ever present. Be sure that your insulation does not add to this danger. Armstrong's Corkboard is approved by fire underwriters—try to burn a cork and you'll see why.

5. Is it made by a reliable company?

Armstrong Cork & Insulation Company has been supplying cork insulation to the cold storage industry for more than thirty years. Branches throughout the country furnish quick, responsible service. Armstrong installations are made by engineers' experts and guaranteed for satisfaction.

Armstrong's Corkboard Insulation

THE STANDARD INSULATION FOR ALL REFRIGERATION

WATER *nor* GREASE *nor* ACIDS
CAN HARM THESE BETTER FLOORS

Duratyle is the ideal flooring for the food processing plant. It is hard surfaced, non-porous and tough. It is acid proof; unaffected by grease or oil, live steam, heat, cold, flushing waters or cleaning fluids. And it is wear-proof . . . even constant trucking over it cannot wear holes or ruts, cannot crack its hard, tough surface.

For permanent floors, sanitary floors, easily cleaned floors . . . in cold rooms, in ovens, on factory floors . . . you need Duratyle.

First cost is last and only cost when you lay Duratyle floors. Duratyle is the economical floor because it is the permanent floor.

Send for comparative cost figures and more details.

DREHMANN PAVING & CONSTRUCTION CO.

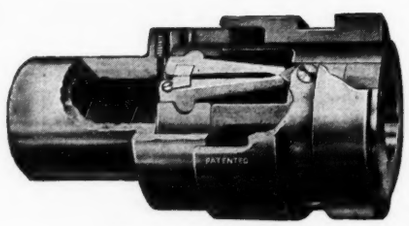
508 Glenwood Ave., Philadelphia, Pa.

THE JOHNSON FRICTION CLUTCH

ELIMINATE OBSOLETE CLUTCHES

THE NEW SUPER-JOHNSON CLUTCH IMPROVES POWER TRANSMISSION ON FOOD PRODUCTS MACHINERY

USE THE SUPER-JOHNSON CLUTCH



Single Clutch—Sectioned

Should the forces in operation suddenly become stuck or jammed, the parts of this SUPER-JOHNSON Clutch WILL NOT SCORE, BREAK OR CRACK — THEY WILL SLIP WITHOUT DAMAGE To The FRICTION SURFACES.

Good Service and Long Life

Double Clutch—Exterior

WIRE, PHONE Or WRITE FOR CATALOG "F.I.—1"

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

Ideal For Quick Frozen Foods

LONG AGO, Sealright Leak-Proof Containers became the nation's choice for fresh packed moist and juicy foods, Now they have demonstrated their dependability and economy for quick-frozen fruits, vegetables and other cold-packed products.

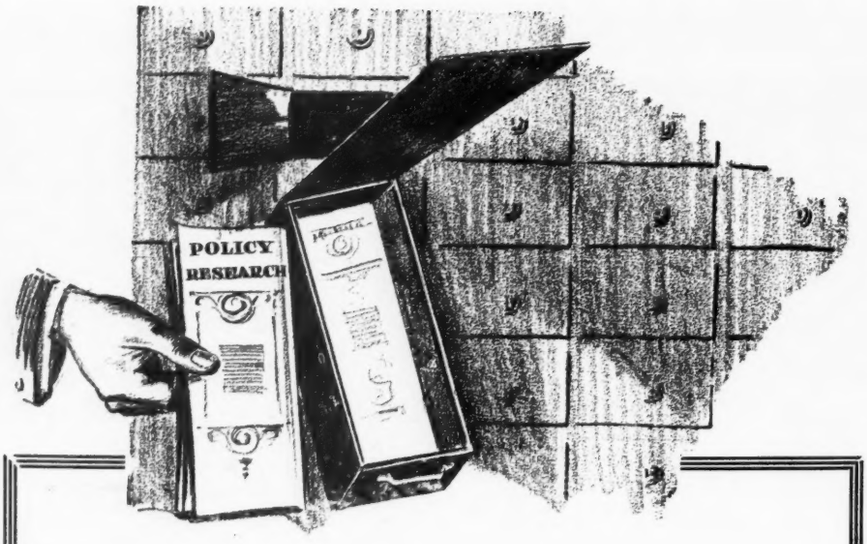
Any food in a Sealright is as easy and safe to carry as a box of crackers. It pays to pack foods the way customers prefer.

Made of pure spruce-pulp paper, thoroughly impregnated with paraffine, Sealrights are leak-proof, crush-proof, practically air-tight. They have a patented double bottom for double safety, and snug-fitting cover-all cover (not a disc).

By packing your frozen foods in Sealrights, you immediately cash in on the public preference for products packed in these round, rigid, rugged containers. Nine years of national advertising have taught consumers everywhere the advantages of buying foods in Sealrights.

You may obtain Sealright Containers plain or colorfully printed to make your package appeal to the eye just as your product appeals to the appetite. Sealrights are available in all standard liquid or dry-measure sizes up to 1 gallon or 10 pounds. Write today for samples and full information. Sealright Co., Inc., Dept. FO-1 Fulton, N.Y. Canadian Address: Canadian Sealright Co., Ltd., Peterborough, Ont.

SEALRIGHT
LEAK-PROOF
FOOD CONTAINERS



PROTECT Profits Through Research

The outside viewpoint is a valuable means of getting at the inside of a problem.

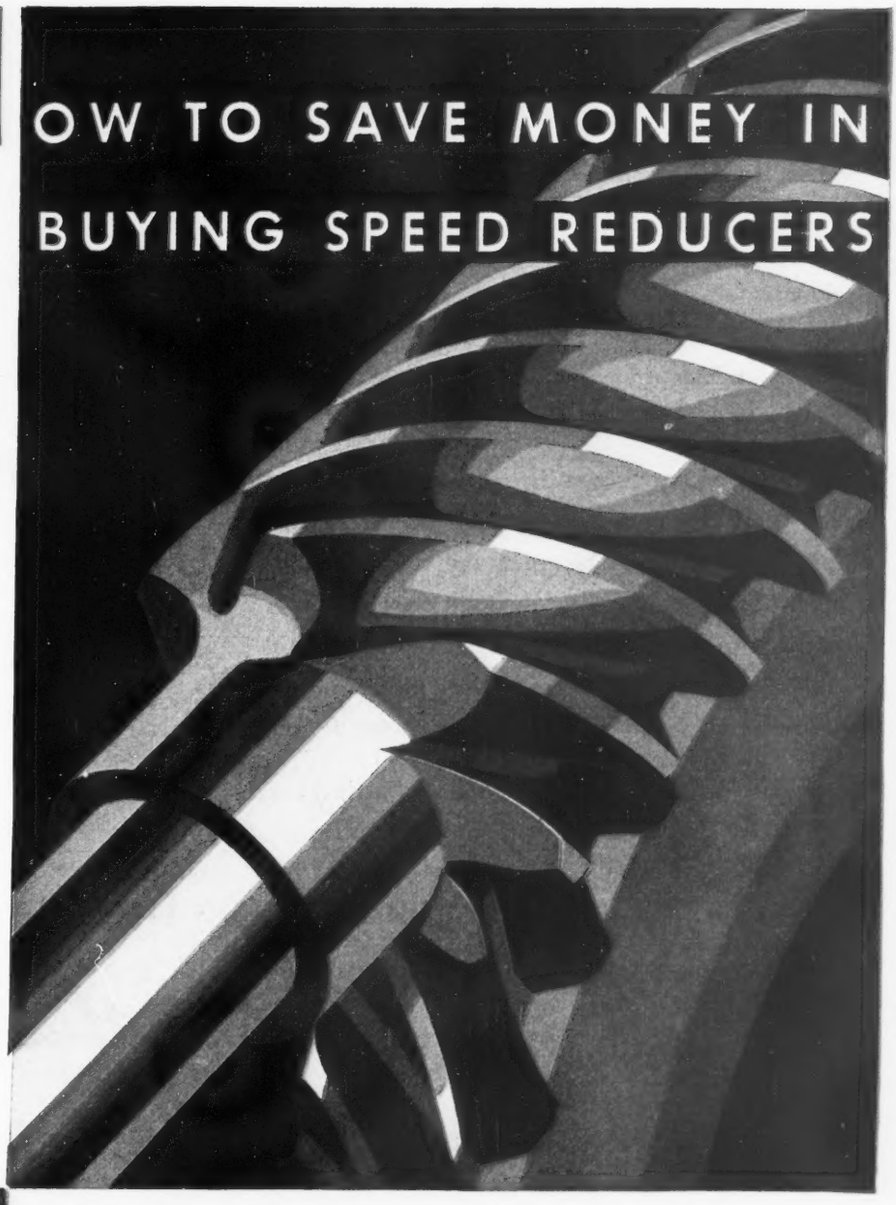
With industry braking its production to meet the retarded speed of curtailed demand, research is now one of the most important items on your payroll. Keep it there—let it be the endowment policy for the future protection of your business—*and don't let it lapse.*

A great opportunity for research is here now. Whether applied for improving old products, developing new ones, or reducing manufacturing costs, there is a competitive advantage arrived at through research. Many manufacturers realize this. They have found that it doesn't pay to curtail research in times of depression. Those that cut research in 1921 are not doing it now.

The outside viewpoint can shorten the time required to achieve your objectives. It has solved kindred problems for others. It will help you protect the business structure of your entire organization against the keener competition which is already here.

WEISBERG & GREENWALD
ENGINEERS ~ CHEMISTS
71 WEST 45TH St. New York

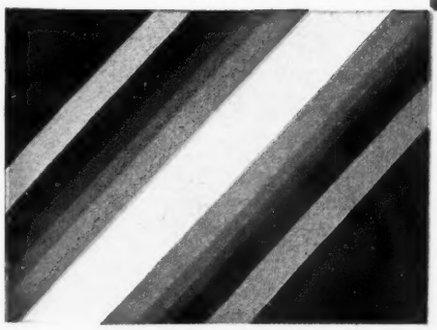
HOW TO SAVE MONEY IN BUYING SPEED REDUCERS



THIS YEAR make one decision take the place of ten . . . or twenty . . . or fifty.

Interviewing salesmen, comparing . . . analyzing . . . takes time. And to the production man, time is money. Why go through the whole costly procedure, every time you buy a speed reducer? Make ONE complete inquiry . . . one decision . . . and let it guide you in future purchases.

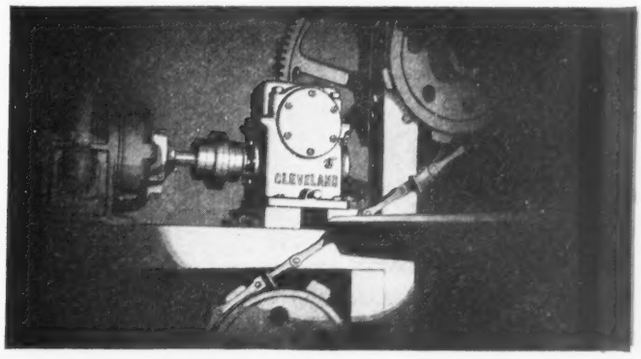
A single investigation, thorough and exacting, will show you conclusively that the most economical speed reducer you can buy is "Cleveland." In "Cleveland" Units, you find the highest quality materials, the finest precision workmanship and design that offers definite operating advantages. You find a record of unfailing performance in the biggest and most important plants. And you discover an engineering staff with a well rounded experience in fitting the right speed reducer to the job.



Many leading manufacturers are saving money by standardizing on "Cleveland" Worm Gear Speed Reducers. We will be glad to explain further how YOU can too.

CLEVELAND
WORM & GEAR COMPANY
3278 EAST 80TH STREET, CLEVELAND, OHIO

CLEVELAND WORM GEARING—THE ULTIMATE DRIVE



Cleveland Unit Type AH driving green corn drag conveyor... Ratio 17½ : 1, 1750 r. p. m.

Announcing . . .
UNIT SPRAY-DRYING

Take an old product and make it new by Unit Spray-Drying. You can do this easily and at moderate first cost. Your initial capital risk will not be great and your equipment can grow with the market for your product. . . *Now a New Product with a New Market.*

High speed, motor driven disc atomizers are used in our Unit Spray Driers. These atomizers are simple, have a long life, and will atomize anything that can be pumped through an 1½" pipe. Sludges, slurries, solutions, suspensions . . . are all alike to these atomizers. Fibres make no difference either. A valuable *New Product* awaits you.

We will gladly furnish additional information about UNIT SPRAY DRIERS if you will write us.

UNIT SPRAY DRIERS

TYPE A

$7,500

F. O. B. Garwood, N. J

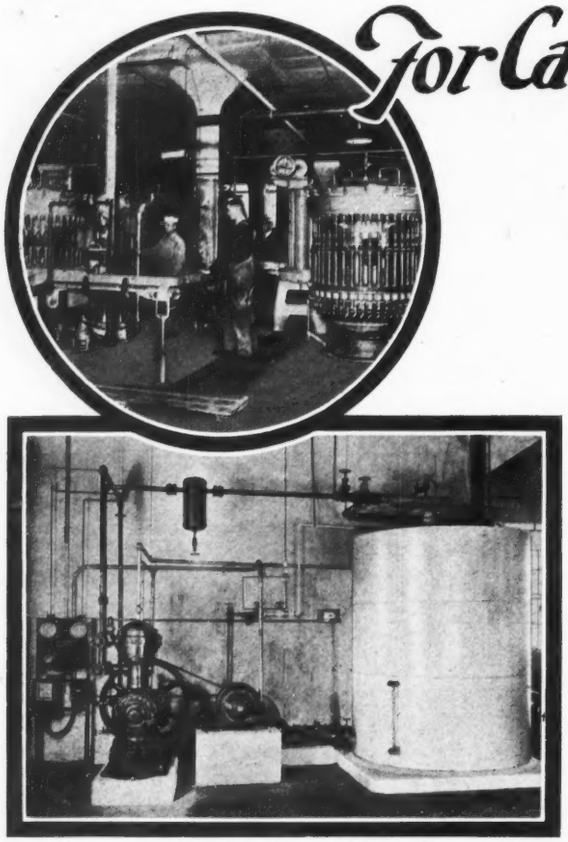
BOWEN

BOWEN RESEARCH CORPORATION, 117 LIBERTY STREET, NEW YORK CITY

For Carbonated Beverages—

TRADE FRICK MARK

Refrigeration



Frick Refrigerating Machine and Water Cooling Tank in Bottling Plant of Roddy Mfg. Co., Knoxville, Tenn.

Cools water close to the freezing point, enabling the Bottler to give the maximum zest and appeal to his product, and do it in the most economical, reliable way. This is only one of a hundred profitable uses for Frick Refrigeration in the Food Industries.

Frick Company

WAYNESBORO, PA., U.S.A.

ICE MACHINERY SUPERIOR SINCE 1883

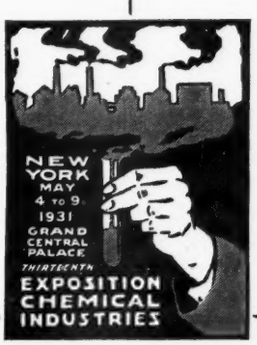
Don't Lock Out Ideas

Business is good for those who make it so

A RECENT survey of a dozen progressive plants revealed that in 1930 four were 28% ahead of 1929. Eight averaged 18% ahead. Business is good for those who make it so by seeking, seizing and applying new ideas for *improving efficiency in every department—improving products—improving processes—improving plants;*

In short—by utilizing every modern aid to cut production and selling costs.

Marked improvement can be made in every food processing plant by a careful, close-up study of all that is new and most modern in process development machinery, methods and equipment. A visit to the Chemical Industries Exposition, Grand Central Palace, New York, during the week of May 4th will be a profitable investment for you and your firm.



Thirteenth Exposition CHEMICAL INDUSTRIES

Management International Exposition Company.

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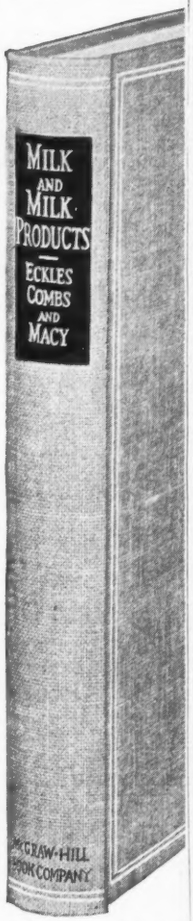
Preparing milk and milk products for market—

This thoroughly modern work deals both with the scientific and practical methods of testing dairy products and preparing them for the market.



Milk and Milk Products

CLARENCE H. ECKLES
Chief, Division of Dairy Husbandry, University of Minnesota

WILLES BARNES COMBS
Professor of Dairy Husbandry, University of Minnesota

and HAROLD MACY
Associate Professor of Dairy Bacteriology, University of Minnesota

EVERY subject of immediate importance to the dairyman is treated in a practical and authoritative manner in this new book. Special attention is given to the composition and properties of milk and the factors, such as bacteria and micro-organisms, which influence these characteristics. Emphasis is placed upon the sanitary production of milk and the value of dairy products to the human diet.

A large part of the book devotes itself to production of dry milk, condensed milk, butter, cheese, ice cream and other milk products and by-products.

Chapter Headings

I—Introduction. II—Constituents of Milk. III—Factors Influencing the Composition of Milk. IV.—Properties of Milk. V.—Milk and Dairy Products as Food. VI—Micro-organisms. VII—The Babcock Test for Determining Fat in Milk and Cream. VIII—Common Dairy Processes. IX—Market Milk. X—Manufacturing of Dairy Products. XI—Cheese. XII—Ice Cream. XIII—Condensed Milk, Dry Milk and Milk By-Products. XIV—Dairy Arithmetic. XV—Miscellaneous Tests. Appendix—Tests and Tables.

375 pages, 6 x 9
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Please send me for 10 days' free examination, a copy of Eckles, Combs and Macy's MILK AND MILK PRODUCTS, $3.50 postpaid. I agree to remit for the book, or return it, postpaid, within 10 days.

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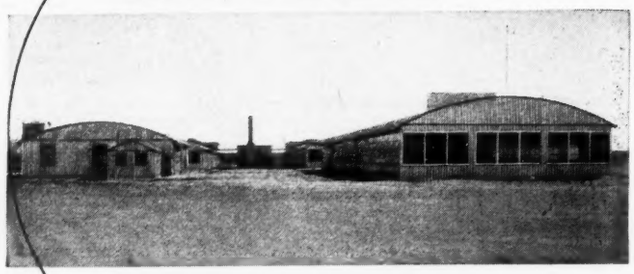
Food 1-31

MADE ENTIRELY OF STEEL

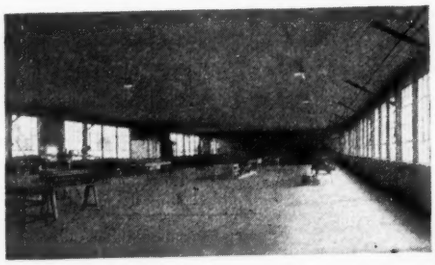
BUTLER



READY-MADE STEEL BUILDINGS

Economical Shelter for Plants Processing or Packing Foods at Points of Food Production

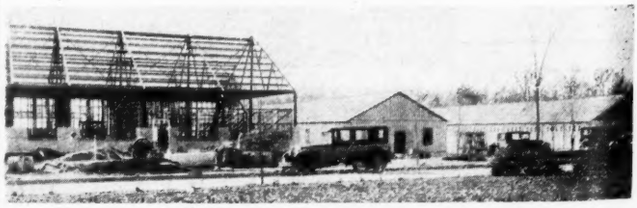
TAKING the factory to the raw product is a growing trend. Particularly so in the food processing industry where the raw product often perishes quickly. Economies in transportation, in labor, in overhead costs and in plant investment are also contributing factors responsible for this decentralization.



Interior view of plant above showing commercial wall board insulation. Plaster on steel lath may also be employed.

In Butler Ready-made Steel Buildings engineers are finding the solution to the problem of sheltering such outpost operations. They completely meet all requirements—Economy of Acquiring—Economy of Installation—Economy of Maintenance — Complete Materials — Speedy and Simplified Erection—Fire Safeness to offset lack of fire protection —and Structural Qualities which make for permanence, yet which permit enlarging, taking down and re-erection.

A new booklet picturing installations of many types of Butler ready-made Steel Buildings awaits your request.



BUTLER MANUFACTURING COMPANY

1249 Eastern Avenue
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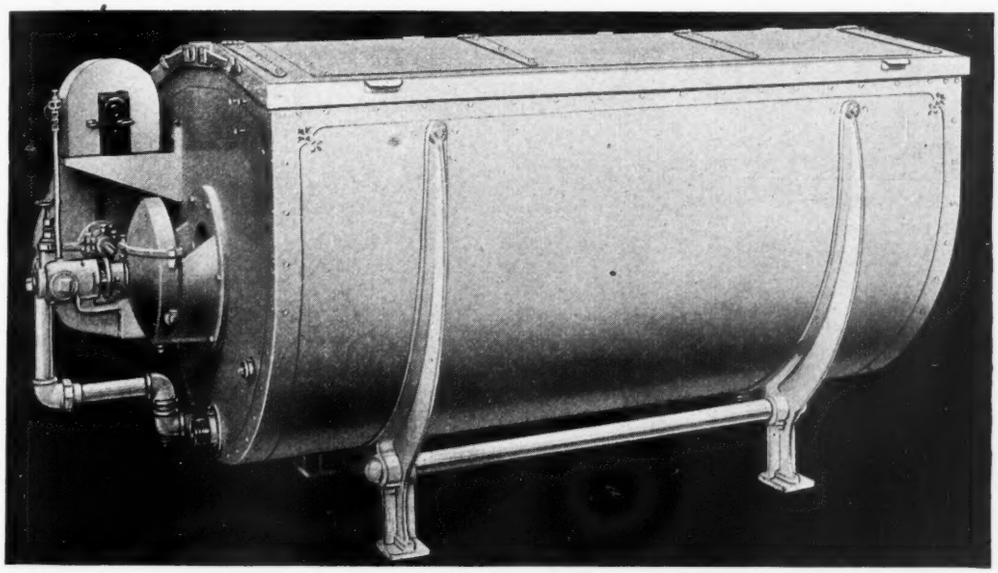
Cherry-Burrell Pasteurizer

Lined with the safe metal

ENDURO

NIROSTA KA2

THE PERFECTED STAINLESS STEEL



THIS pasteurizer, for most exacting service, is lined with ENDURO NIROSTA KA2, the perfected stainless steel which is processed according to patented Krupp specifications.

■ In the dairy industry, this improved alloy is specified for numerous equipment and piping installations, because it is not attacked by milk or dairy products of any kind, nor by chemical sterilizers, nor refrigerating brines. Further, most exacting tests by leading dairy engineers and laboratories show that ENDURO KA2 is without effect on taste or color of dairy products.

■ But of equal importance is the permanence of ENDURO. It is far stronger than ordinary steel. Its hard lustrous surface cannot wear off or peel, because ENDURO is a solid metal. Under ordinary use, it will last a life time.

■ Leading dairies and food process plants now specify this improved stainless steel for their equipment. Be sure you specify ENDURO in your next order.

ENDURO

Central Alloy Division

REPUBLIC STEEL

CORPORATION

Massillon, Ohio

TEMPERATURE LOOMS LARGE IN EVERY INDUSTRY

OF COURSE Motoco Industrial Thermometers are accurate and dependable. They always know exactly how hot or cold it is in the vats and tanks—or the storage and cooling rooms, pipelines and special machines—into which they stick their sensitive finger. They check and double check; for contacts and relays may be built into them that will sound alarms, start and stop things, at a certain temperature.

They know but they let *you know,* too. No stage fright for them. Their bold black-and-white dials and brilliant-red pointers *force* themselves upon your attention, fairly shout their findings at you. With a Motoco on the job the worker certainly can't blame the spoiling of a batch on the thermometer.

And *remote temperature control* is yours, too, if you want it. You can install a Motoco at a considerable distance from the point where the temperature is taken—in fact you can combine all the thermometers in the plant on one centrally located control board. Armored capillary tubing does that. No more climbing up hot tanks and over dripping pipes to peer at an evasive silver thread and *guess* at facts. Instead, *the truth,* all the truth and nothing but the truth, *when and where you want it.*

In most industrial processes positive temperature control means *a better product;* and, of course, a better product means *more profit.* Motoco Industrial Thermometers are the modern way to positive temperature control. There is only one conclusion to be drawn from these facts: Bring your temperature-measuring equipment up-to-date with Motoco Industrial Thermometers.

Write today for bulletin FI- 131

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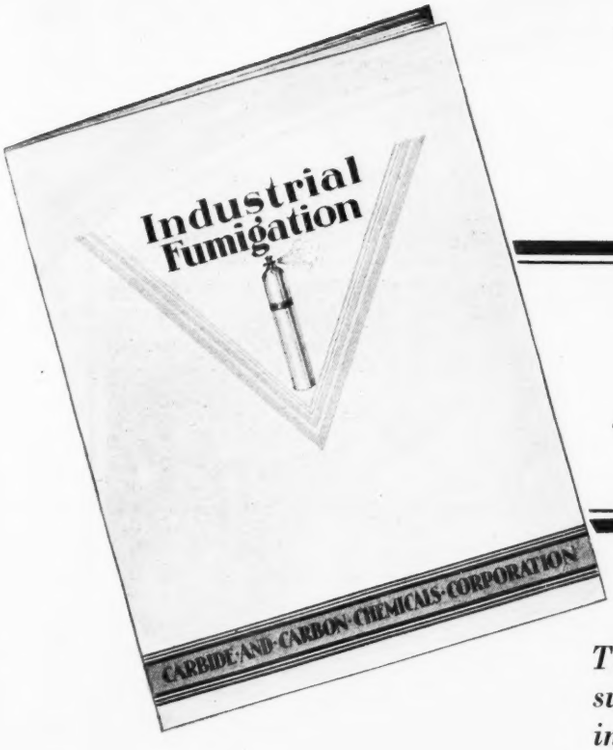

Send for a copy of
"INDUSTRIAL FUMIGATION"

The latest information on this important subject—right to the point and dealing specifically with all food problems.

● From the December issue of Food Industries—"Treating Grain for the Destruction of Injurious Insects" by Laurel Duval, Chief, Grain Inspection Department, New York Produce Exchange.

"In conclusion, it may be stated that ethylene oxide-carbon-dioxide mixture (Carboxide) is admirably adapted for the fumigation of stored grain intended for any purpose except where high percentages of germination are required. This mixture is in no way harmful to the most delicate food products. Solid carbon dioxide is beneficial to the grain and in combination with ethylene oxide has given evidence, in some instances, that it retards the growth of molds. Both chemicals disappear in the form of gas and do not leave or cause any addition of moisture to the grain."

CARBOXIDE...The Ideal Fumigant

BY mixing Ethylene Oxide and Carbon Dioxide we get Carboxide. It possesses every desirable property of an industrial fumigant. Carboxide contains nine pounds of Carbon Dioxide to one pound of Ethylene Oxide and is available in cylinders. At the cylinder pressure this mixture is stable and homogeneous—it may be stored indefinitely without deterioration of its insecticidal properties.

Carboxide can be used with perfect safety in any fumigation problem. It is free from all fire hazard and meets the most rigid insurance requirements. Its human toxicity is low, and with very moderate precautions it may be employed without physical discomfort. Its use with foodstuffs of any description is attended by neither injurious nor undesirable after-effects.

Write for a copy of "Industrial Fumigation"—you should have it to know the latest—you should have it for reference. No charge or obligation.

CARBIDE & CARBON CHEMICALS CORP.
30 East 42nd Street New York, N. Y.

Carbide and Carbon Chemicals Corporation
New York, N. Y.

● Please send my copy of "Industrial Fumigation".

We are interested in the fumigation of ..... PRODUCT

Name .....

Company .....

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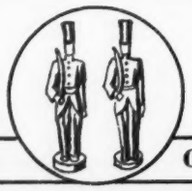
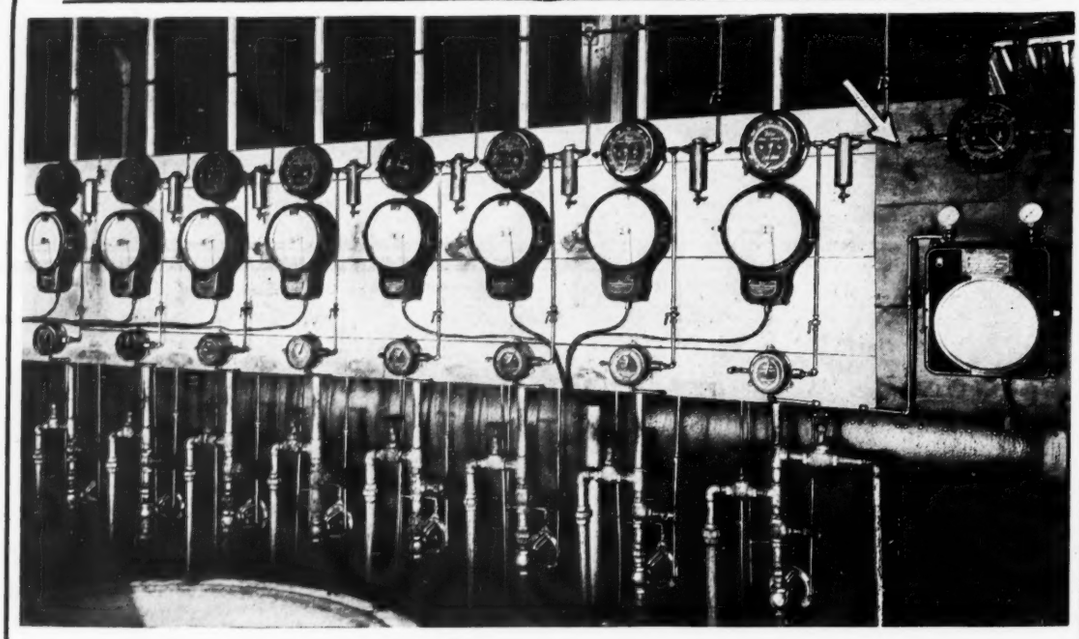


TYCOS CONTROL ∞ *TYCOS* CONTROL ∞ *TYCOS* CONTROL



Every batch is just the same

WITH *Tycos* "TIME" CONTROL

Just as mechanical control is depended upon for so many devices requiring perfect timing and accurate regulation—so *Tycos* Recording Regulators are today considered indispensable in food plant operation.

No matter how faithful and competent a man may be, he cannot produce as accurate and uniform results as a *Tycos* Regulator on a cooker, retort, sterilizer or canning machine. And further it would take many men to do the work of *Tycos* Regulators on a battery of a dozen or more cookers.

Tycos Full Automatic System of Temperature Control contains an accurately calibrated Time Element, which begins timing only when the required temperature is reached. This temperature is maintained exactly the length of time necessary for perfect results, when the steam is automatically shut off and the vessel cooled. The next batch is automatically controlled in the same manner.

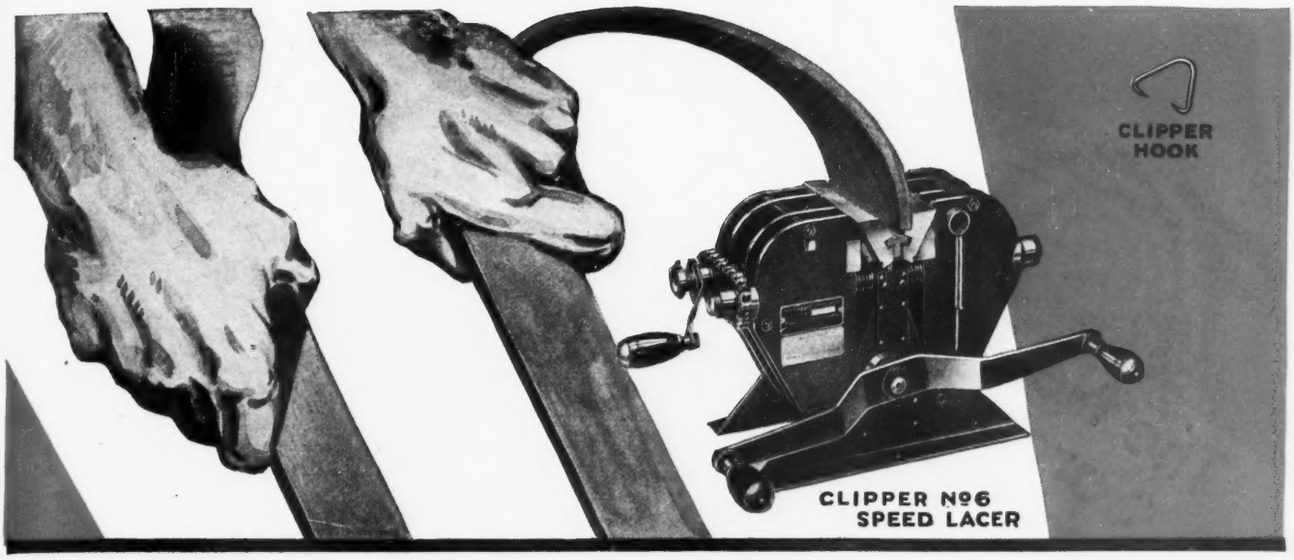
Get complete details now.

Taylor
Instrument Companies

ROCHESTER, N. Y., U. S. A.

Canadian Plant, *Tycos* Building, Toronto

Manufacturing Distributors in Great Britain, Short & Mason, Ltd., London



CLIPPER LACED BELTS DRIVE THE MACHINERY OF THE WORLD!

North—South—East—West—from Occident to Orient—the machinery of the world's greatest industrial plants is driven by Clipper Laced Belts.

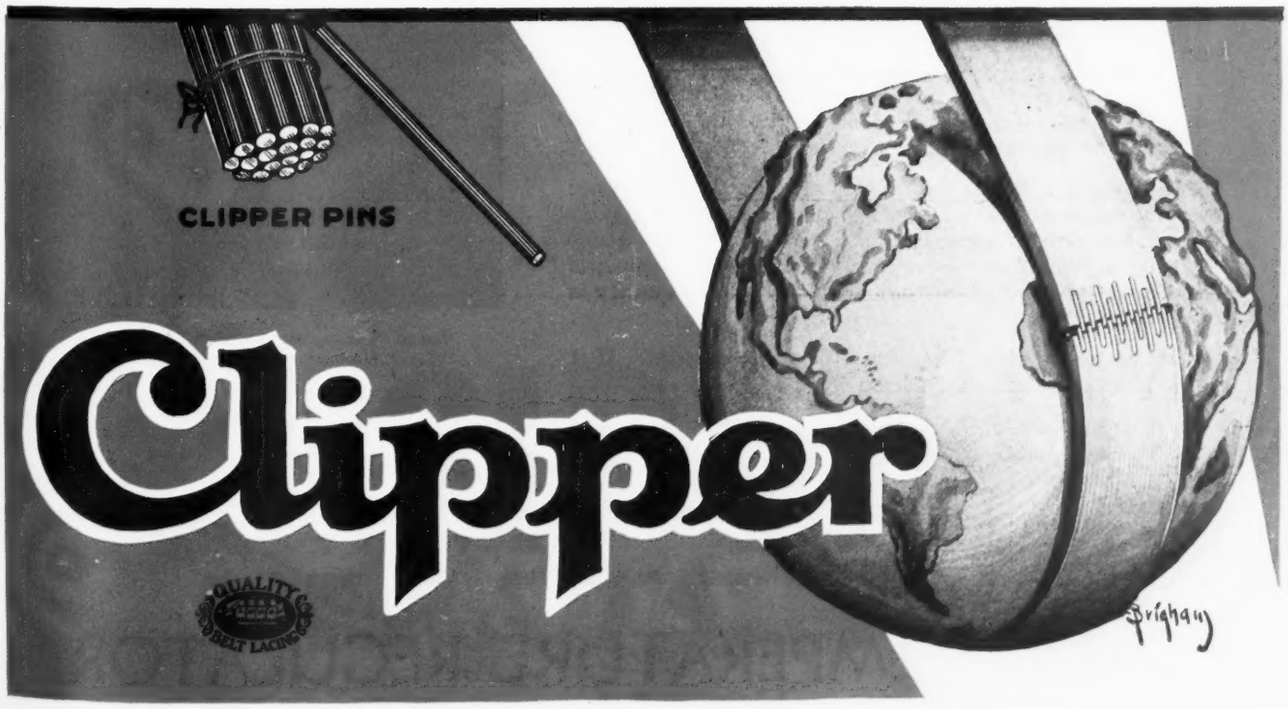
The Clipper No. 6 Speed Lacer is recognized as the last word in belt lacing speed and efficiency. Light and compact, yet marvelously powerful, it laces both ends of a six inch belt in exactly 90 seconds.

Clipper Hooks are unsurpassed in quality and durability, yet enormous production brings them to the user at a price actually 20 to 30% lower than that of other makes.

Plant executives seeking greater economy of operation and production efficiency during 1931 should standardize on Clipper equipment for every lacing need.

For complete demonstration communicate with your nearest dealer or with the

Clipper Belt Lacer Company, Grand Rapids, Michigan



The Newest Mississippi River Boats Use Sarco Temperature Regulators

FOUR of these super towboats, just completed for Standard Navigation Co., and the last word in river craft, have their hot water service tanks equipped with Sarco Temperature Regulators.

These simple automatic valves eliminate guesswork and make temperature control a mechanical certainty. Consequently there is not only a saving of steam that is wasted when valves are operated by hand, but a saving of workmen's time.

Furthermore, the Sarco demands no salary, it observes no clock and never forgets.

No compressed air, electricity or water power is required to operate. No pipe lines needed. They are inexpensive to install and to maintain.

Important as Sarco Regulators are in maintaining hot water temperatures—they show even greater economies where temperatures *must be maintained accurately* under penalty of loss of expensive materials, delayed shipments and dissatisfaction of customers when uniform quality is not maintained.

Let us send you a Sarco on 30 days' free trial. If it does not sell itself, don't keep it.

Write for Catalog AE-70.

Sarco Temperature Regulator for Hot Water Heaters on Towboat "Tennessee"

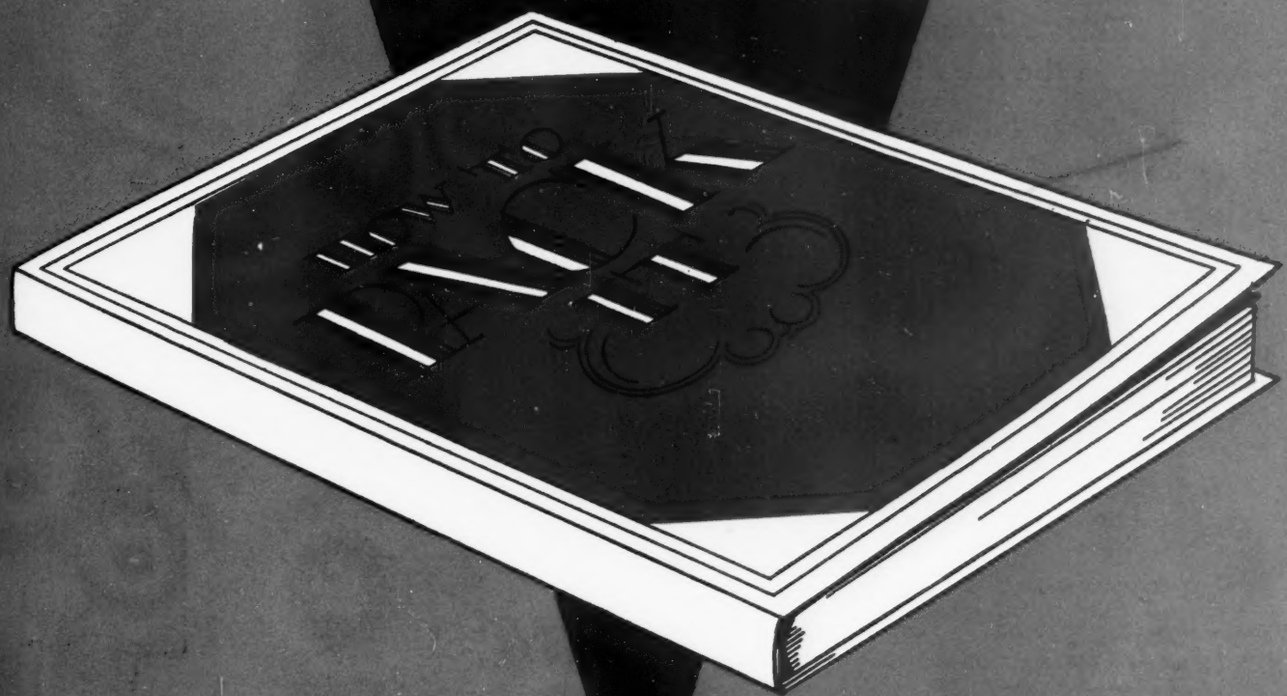
SARCO COMPANY, Inc.

183 MADISON AVE. NEW YORK, N. Y.

Branches in Principal Cities

SARCO TEMPERATURE REGULATOR

GET THIS BOOK



IT POINTS OUT THE 4-FOLD BENEFITS OF H&D SERVICE

SIZE · LOCATIONS · EXPERIENCE · ENGINEERING

THE BENEFITS OF H&D SERVICE ARE 4-FOLD

NO matter what your packaging needs you can take full advantage of the four-fold benefits of H & D Service:

1. *The World's Largest Packaging Organization* —giving you the use of ample facilities.

2. *Wide Spread Locations*—twenty-five mills and factories with thirty-one service offices offer packaging service as near as your needs.

3. *The Experience of Nearly Half a Century*—in meeting the packaging requirements of thousands of shippers in all lines of business.

4. *A Staff of 50 Trained Package Engineers*—who know how to analyze a packaging problem and to design a shipping box of maximum efficiency and economy.

"How to Pack It," a new H & D booklet on scientific packaging, will give you a more complete idea of Hinde & Dauch Service. Mail the coupon for a free copy.

H & D Package Engineers will gladly study your packaging needs and place at your disposal the four-fold benefits of H & D Service. Their recommendations will not obligate you in the least.

THE HINDE & DAUCH PAPER COMPANY
829 DECATUR STREET SANDUSKY, OHIO

Western Address:
KANSAS CITY FIBRE BOX CO.
PACKERS STATION KANSAS CITY, KANSAS

Canadian Address:
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HINDE & DAUCH corrugated fibre SHIPPING BOXES

THE HINDE & DAUCH PAPER COMPANY
829 Decatur Street, Sandusky, Ohio

Please send me a copy of "How to Pack It."

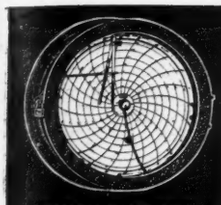
Signature_____ We Pack_____

Company Name_____

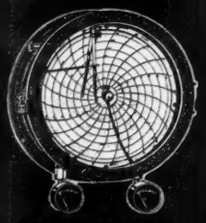
Address_____

City_____ State_____

H&D MAIL THE COUPO



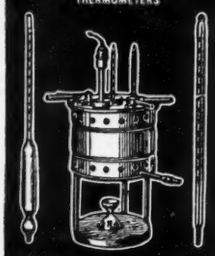
RECORDING THERMOMETERS AND PRESSURE GAGES



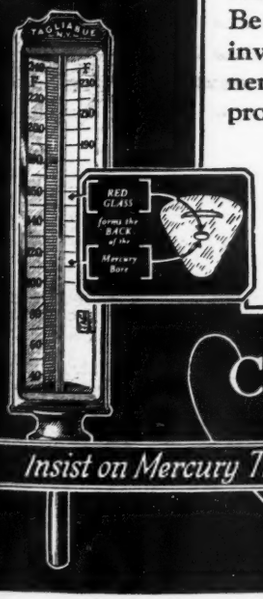
RECORDER - CONTROLLERS

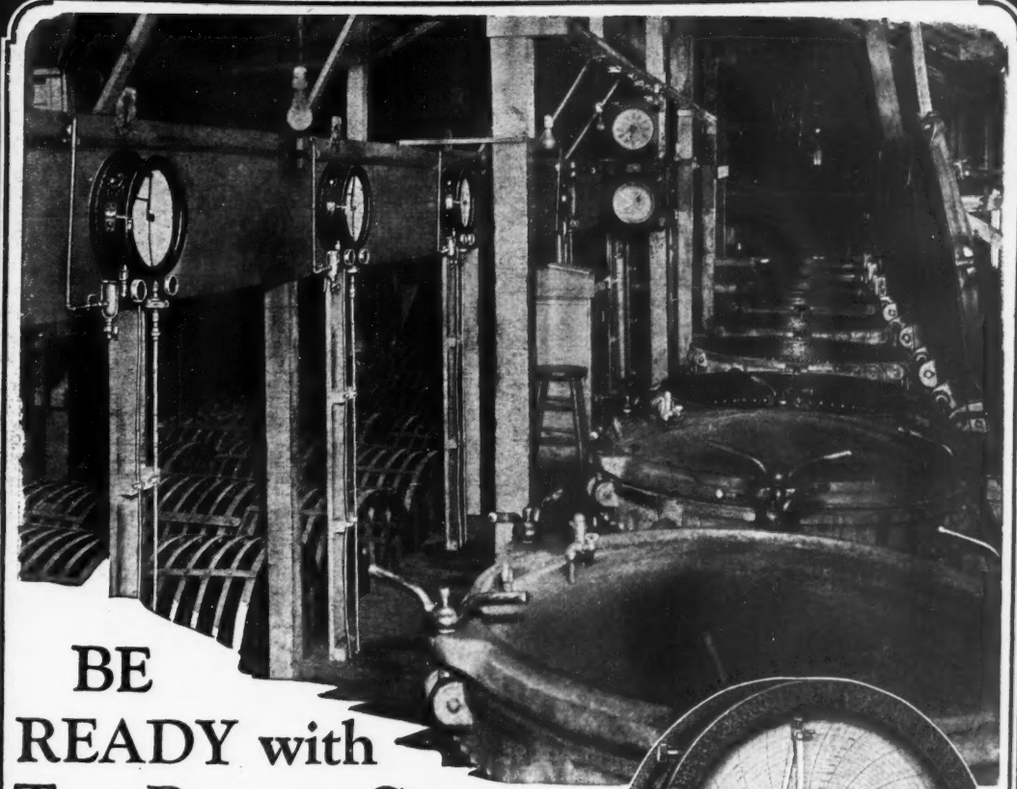
AUTOMATIC CONTROLLERS

DIAL - INDICATING THERMOMETERS



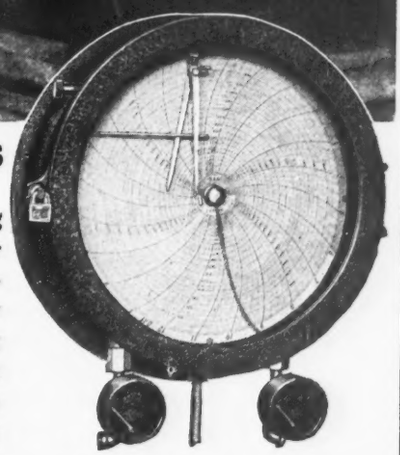
OIL TESTING INSTRUMENTS, THERMOMETERS, HYDROMETERS, ETC.





BE READY with TAG Recorder-Controllers

THE trend toward state and federal canning regulations need cause you no worry if your retorts are equipped with TAG Recorder-Controllers. The temperature will be automatically maintained at the pre-determined setting point and a uniform written record of the entire cook will be available for the stamp of approval of the inspector. Whether your cannery is in a state where such close records are required or not, think of the added profits TAG Recorder-Controllers will give you by eliminating spoiled products and by improving the quality of your pack. Be ready for the coming canning season—start investigations at once and learn how other prominent canners and food manufacturers lower their processing cost with TAG Recorder-Controllers.



MANY exclusive features will be found in the perfected TAG Recorder-Controller. All these features and the complete line of TAG instruments for the canning industry are fully described in our new booklet entitled "Cannery Control." Get your copy at the show or write for it today.

TAG Engineers will be pleased to discuss any of your temperature problems. Be sure and consult them in Booth 12 at the show in the Steven's Hotel, Chicago, January 19th to 24th, 1931.

C. J. TAGLIABUE MFG. CO.

PARK AND NOSTRAND AVE'S., BROOKLYN, N. Y.

Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

TAG C. J. TAGLIABUE MFG. Co. BROOKLYN
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BRANCH OFFICES AND *FACTORIES
BIRMINGHAM, ALA. BOSTON, MASS. CHICAGO, ILL. *CLEVELAND, OHIO
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*SHREVEPORT, LA. ST. LOUIS, MO. TORONTO, ONT., CAN.

If the President's Office must be Hot

PEOPLE IN OTHER ROOMS NEED NOT SUFFER

Sylphon No. 875 Automatic Radiator Valves bring heat harmony to any steam heated apartment, home, office, or factory building. They save fuel also by preventing room temperature fluctuating and repeated adjustment. These new Sylphon complete control units, responding to slightest changes in the air temperature, automatically regulate the steam flow to the radiators.

Once the marked thermostatic head is set, they maintain that constant degree of warmth desired by the occupants of each room. Without any further radiator attention Sylphon Radiator Valves hold one room "Cool," one "Medium" and another "Hot" and so on with the whole thermometer range of comfort as the selective limit.

THE AUTOMATIC RADIATOR VALVE

Banishes Fuel Wasting, Fluctuating Temperatures

Room temperatures never get "too Hot" or "too Cold" when a Sylphon 875 Radiator Valve is on guard. It is a combination Packless Valve and Thermostatic Control Unit, easily installed, inexpensive and without electrical or mechanical accessories to get out of order. Its use prevents uneven, wasteful and injurious heat. Owners and managers of factories, hotels, apartments and office buildings should know about this practical automatic radiator control. Both angle and globe types fully described in our literature.

Sylphon TRADE MARK

WRITE NOW FOR BULLETIN AB-250

FULTON SYLPHON Co.
KNOXVILLE, TENN., U.S.A.

Representatives in all principal Cities in U. S. A.—European Representatives, Crosby Valve and Eng. Co., Ltd., 41-2 Foley St., London, W. I., Eng.; Canadian Representatives, Darling Bros., Ltd., 140 Prince St., Montreal, Que., Canada.

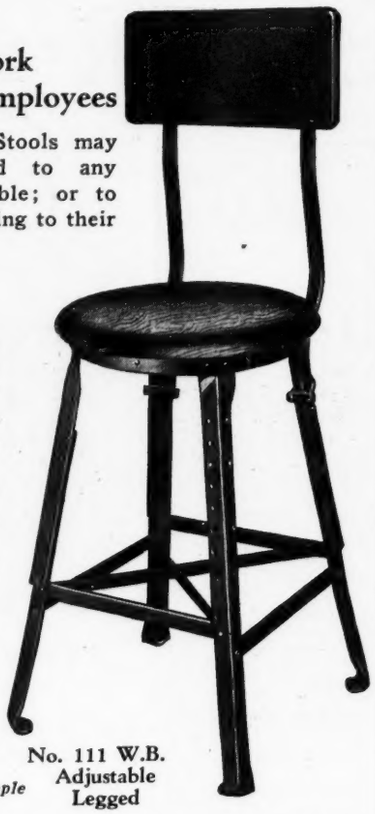
STOOLS

to fit your work and your employees

Adjustable legged Stools may be readily adapted to any height bench or table; or to fit employees according to their physical stature.

No. 111 W.B.

This Stool is adjustable from 18 in. to 28 in. in height by means of stove bolts on the legs. The seat is of hardwood, 14½ in. diameter, concave and comfortable. Back rest is 14 in. wide x 6 in. high, hardwood, and form fitting. Seat and back rest finished either mahogany or light oak. Back rest is adjustable up and down. Steel frame of Stool is finished in olive green enamel, oven baked. A rigid, durable, economical priced Stool.



No. 111 W.B. Adjustable Legged

Same Stool without the back is our No. 101

Mfg. by
ANGLE STEEL STOOL CO.
The Steel Equipment People
Plainwell, Michigan

Represented in all principal cities.

Spares no dirt spangles no tin

Slop and dirt are thoroughly removed from cans without any danger of spangling the tin when cleaning is done the Oakite way.

The energetic action of this effective material quickly loosens every trace of sticky, slopped-over food, and all foreign matter, without discoloring the tin in any way. And Oakite rinses away so readily that no films or deposits are left on the metal, to interfere with labeling.

Write us and our near-by Service Man will call. Ask him for suggestions on doing any cannery cleaning job better and at lower cost.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the United States and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St.,
NEW YORK, N. Y.

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

One Responsibility for the Complete Texrope Drive

THE belts as well as sheaves for V-belt drives are *equally* important.

When the diameter of the driver sheave is less than established minimums, the belts will not give long service. Bending a belt over too small a sheave subjects the cords to constant flexing at a sharper angle than good practice permits.

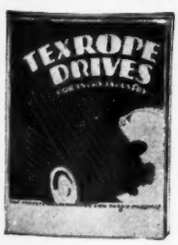
In recommending the correct size Texrope Drive, Allis-Chalmers engineers recognize these facts . . . and take them into consideration.

The result of this long-established policy is that over 95,000 Texrope Drives are now in use . . . and on many of the first drives sold the original belts are still in service.

The newest type Texrope Belts possess amazing flexibility . . . and have proved that they will give even longer service than the older ones. They represent years of development by Allis-Chalmers and Goodrich.

In the manufacture of sheaves, Allis-Chalmers has minimized vibration by perfect machining and absolute accuracy. But you buy *more* than sheaves and belts when you buy from Allis-Chalmers. You buy a *complete drive, correctly engineered, and guaranteed by a company with more than eighty years experience* in the production of power machinery.

The Whole Story of the Texrope Drive in 8 Minutes. Ask for a copy of Bulletin 1228.



Let us show you the economy of the Texrope V-belt Drive . . . silent, slipless and 98.9% efficient.

ALLIS-CHALMERS MANUFACTURING CO.
Texrope Division Milwaukee, Wis.
Specialists in Power Machinery Since 1846

ORIGINATED BY ALLIS-CHALMERS

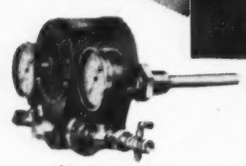
TEXROPE DRIVES

THE DRIVES THAT REVOLUTIONIZED TRANSMISSION PRACTICE • • •

just out!

Single Service Temperature Controller, Vapor Tension System

Double Service Temperature Controller, Vapor Tension System



Air Operated Temperature Controller, Vapor Tension System

Air Operated Temperature Controller, Expansion Stem System

Air Operated Pressure Controller. Air-operated Vacuum Controller Is Similar in Appearance

THIS new publication spotlights apparatus that automatically controls operations in rendering kettles, scalding tanks, sausage roasters, cookers, canning retorts, exhausters, sterilizers, steam-heated and gas-fired baking ovens, dough rooms, proofing rooms, bottle washers, pasteurizers, cooling systems and other food processing equipment.

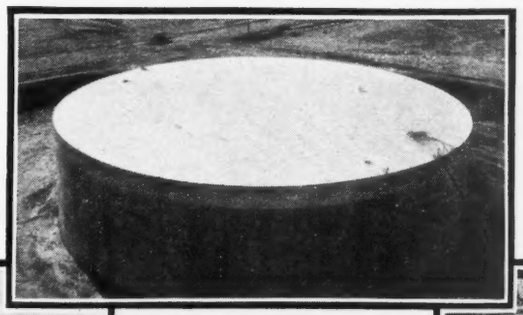
Get your copy now. It may suggest means for big economies in your plant. . . Write—

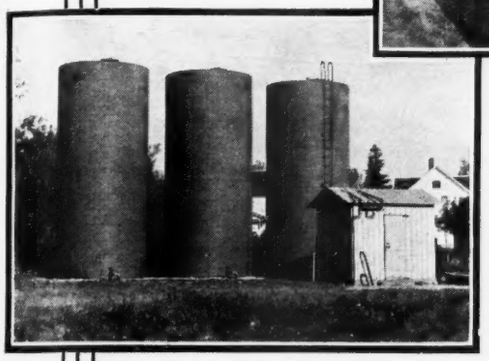
The Bristol Company
Waterbury, Connecticut

Air Operated Combination Controllers—Pressure and Temperature, Temperature and Vacuum, and Pressure and Vacuum

Air Operated Draft Controller

BRISTOL'S
SINCE 1889
Instruments *for* Indicating Recording Controlling





Whatever it takes— GRAVER Makes It

IF it's storage—ask Graver about it first. Vertical or horizontal tanks—below or above ground, or field storage of large capacity; Graver has the experience that insures correct design, the equipment that guarantees economical fabrication and experienced field crews that speed up erection and oversee initial operation.

Seventy-three years is not a positive guarantee of quality, but Graver reputation after seventy-three years says much for consistent quality and continued satisfaction.

Ask us about Graver service. Let us consult with you about storage requirements.

GRAVER TANK & MFG. CORP.

STEEL PLATE CONSTRUCTION

EAST CHICAGO, INDIANA

AN ADHESIVE FOR EVERY MACHINE OR HAND OPERATION

START 1931 RIGHT!

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Standardize on . .

MIKAH

GLUES • GUMS • PASTES

for your

Adhesive requirements

A comprehensive line continually being developed to meet every need of the Food Industry.

Trial lots of those products suitable for your particular condition will be gladly submitted on approval.

NATIONAL ADHESIVES CORPORATION

Executive Offices: NEW YORK

WORLD'S LARGEST PRODUCER OF ADHESIVES

PRE-EMINENTLY *the South's leading food distributing point!*

LONG RANGE METHODS ARE OBSOLETE

Manufacture it where it's SOLD

Merchandising has increased its tempo. Manufacturing must speed up to keep in step.

The merchant now plays for quick turnover and carries correspondingly smaller stocks—but replenishes more frequently. The source of supply must be at *hand.*

Factories and branch plants must be intelligently placed to take care of immediate delivery—salesmen must be within an overnight jump by train or a few hours by airplane from the customer—"six months" delivery datings are obsolete.

Fort Worth is already recognized as the manufacturing center of the Southwest. It is the financial and transportation center of a huge and rapidly growing territory.

Here, every condition is favorable to the manufacturer.

With an unlimited supply of natural gas; power rates as low or lower than at any other point in the Southwest; unexcelled transportation facilities; an abundant supply of intelligent, native white labor; a bountiful water supply with low water rates; an ideal climate for year around operation and the most rapidly developing consuming territory in the country—

Fort Worth Is Dominant As a Manufacturing Center

Write for your copy of INDUSTRIAL FORT WORTH

12 AIR LINES

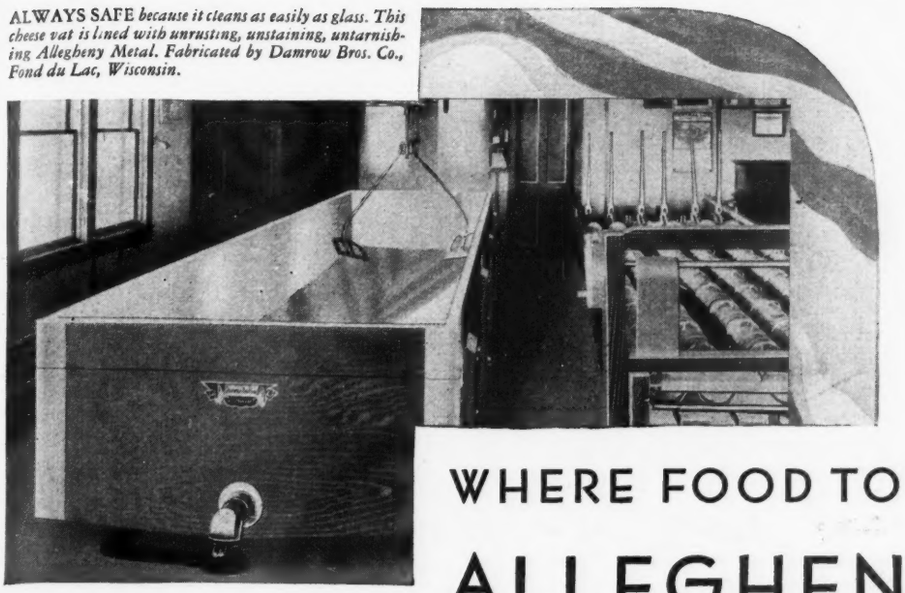
FORT WORTH

THE MANUFACTURING AND TRANSPORTATION CENTRE OF THE SOUTHWEST

19 RAIL OUTLETS

For Information, Address Publicity Department CHAMBER OF COMMERCE, FORT WORTH, TEXAS

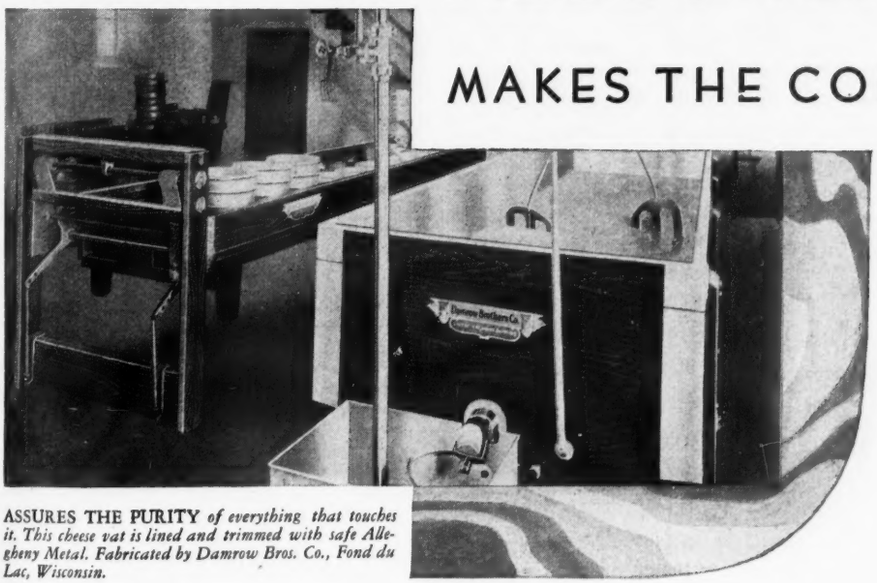
ALWAYS SAFE *because it cleans as easily as glass. This cheese vat is lined with unrusting, unstaining, untarnishing Allegheny Metal. Fabricated by Damrow Bros. Co., Fond du Lac, Wisconsin.*



Allegheny METAL

WHERE FOOD TOUCHES METAL

ALLEGHENY METAL MAKES THE CONTACT SAFE



ASSURES THE PURITY *of everything that touches it. This cheese vat is lined and trimmed with safe Allegheny Metal. Fabricated by Damrow Bros. Co., Fond du Lac, Wisconsin.*

Foods stored in Allegheny Metal tanks or vats contract no metallic tastes

ALLEGHENY METAL meets every normal food condition without rusting, staining or tarnishing. And under the severest acid tests it has been found to be the best corrosion-resisting material available.

Time need not be lost waiting for tanks or vats of Allegheny Metal to be cleaned and made ready for the next batch or solution . . . for this wonder alloy can be cleaned as easily as glass. No laborious scraping or scouring with abrasives or strong cleaning fluids is necessary.

This alloy is stronger than mild steel . . . and so is not readily dented or scratched. Allegheny Metal never needs replating, for there is no plating to wear off.

These features make Allegheny Metal the logical material to choose for contact with every kind of food product.

Don't let another day pass before you find out more about Allegheny Metal. Don't take our word for what we say about our alloy. Visit a plant that has Allegheny Metal equipment. See this wonder alloy under actual working conditions. Specify it for your new equipment . . . replace old equipment with Allegheny Metal.

ALLEGHENY STEEL COMPANY
Brackenridge, Pa. . . . *Offices:* New York, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Philadelphia, St. Louis, Milwaukee, Los Angeles. *Warehouse Stocks:* Joseph T. Ryerson & Son, Inc.—Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia . . . *In Canada:* Samuel & Benjamin, Ltd., Toronto.

ALLEGHENY METAL

Licensed by the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378

Protect your product in transit—*with* WOODEN BARRELS

Reduce the hazards your products in transit must encounter. Minimize the danger of damaged goods, peeved customers, and troublesome freight claims.

There's no better way to do it all than by the use of the "old reliable" among containers—WOODEN BARRELS. Wooden barrels have all the good "points" of all other containers, and a number the others don't have.

For instance, wooden barrels *have* no "points," no corners—they're round! They don't have to take the bumps and jolts of rough handling squarely—so they don't hurt. The double arch design — embodied only in wooden barrels—enables the wooden barrel to reduce the force of jolts.

And because it's made up of a number of staves bound together by external pressure, the wooden barrel is more or less *resilient,* to absorb jolts. Its engineering design has never been equaled in container construction.

That's why the use of tight or slack wooden barrels, for products dry, liquid, semi-liquid, or powdered, continues to grow through the years. That's why your products are best protected in storage, in handling, or in transit by packing them in wooden barrels.

The Associated Cooperage Industries is here to aid you in solving container problems, to give the data you require.

Some WOODEN BARREL Advantages

Protection
- Against contamination
- Against deterioration
- Against atmospheric changes
- Against dampness

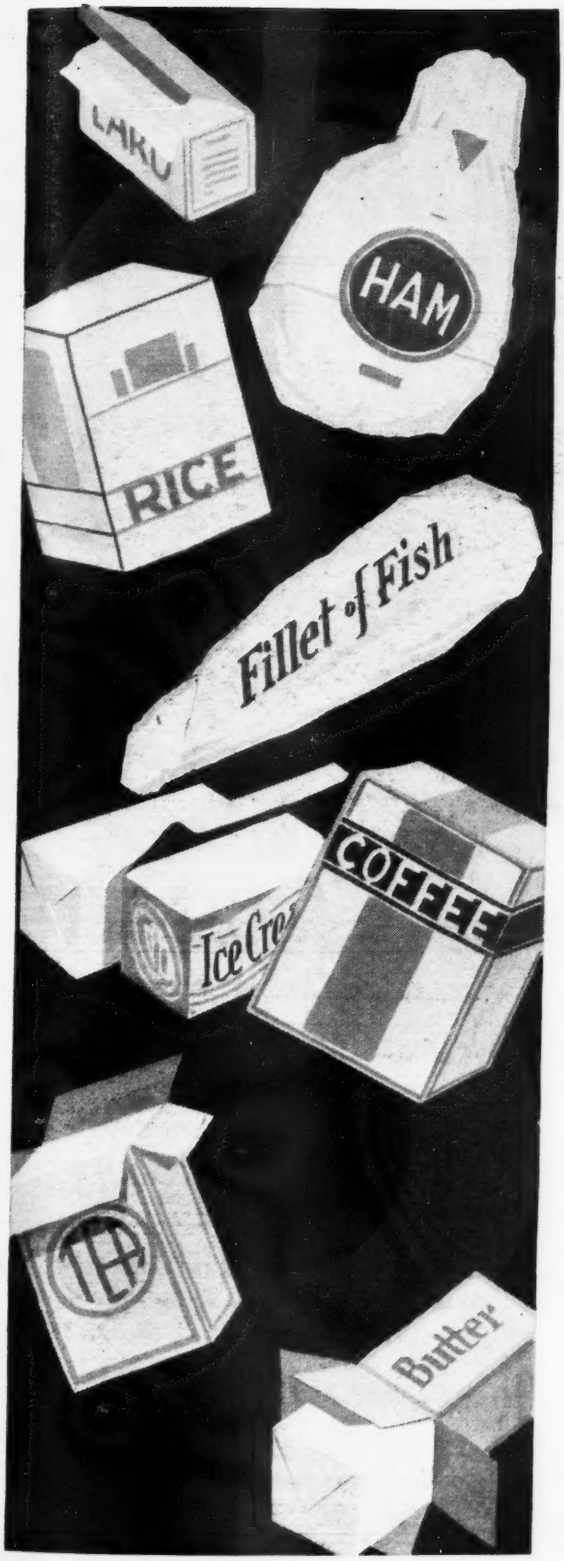
Safe in Transit
- Arch design for strength
- "Resilience" due to multiple-stave pressure-bound construction
- Circular form "sheds" the force of blows in transit

Sanitation
- Made of clean fresh wood
- Contact with exterior moisture causes staves to seal still more tightly

Ease of Handling
- Easy to roll and to guide
- Easy to upend
- Easy to fill and to empty

THE ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA
Railway Exchange Building, St. Louis, Missouri

WOODEN BARRELS



KVP

Beyond Price Competition

IT IS generally known that good packaging is not only valuable to protect foods and prevent waste -- it also results in the "Consumer identity" which is a big help to keep prices at a profit making level.

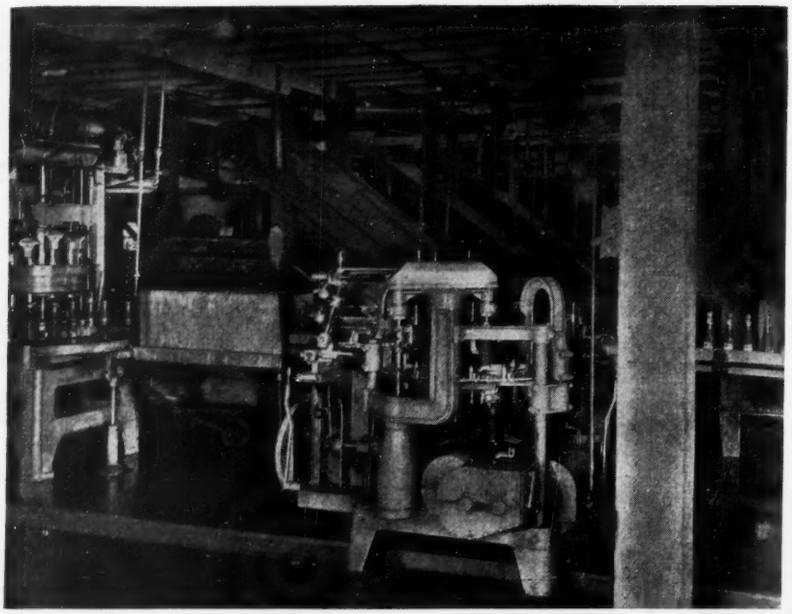
This important factor of price-maintenance alone, would make packaging a necessity but there are other vital reasons. There are new conditions and shifting markets -- changes in types of cartons and in production methods -- all calling for special wrappers to fit the varying products, climates and shipping conditions.

This company is proud to be consulted by so many industrial leaders who look to its skilled corps of Research Engineers for the exact protection of their products; foods wet and dry, greasy or fresh -- to be shipped to any climate, a mile away or across the world.

Whatever your particular problems are will you let us talk them over? There is not the slightest obligation entailed.

KALAMAZOO
VEGETABLE PARCHMENT CO.
KALAMAZOO -- MICHIGAN
MANUFACTURING WORLD-FAMOUS FOOD-PROTECTION PAPERS

PROTECTION PAPERS



O & J Single Labeler and O & J Crowner in the plant of Edgar F. Hurff, Swedesboro, N. J.

LABELING COSTS CUT 49% *with* O&J LABELERS

Edgar F. Hurff, catsup packer of Swedesboro, New Jersey, is putting out a large part of his pack in glass. 8 ounce and 14 ounce octagonal bottles are being used.

An O & J Single Labeler is being used to affix body and neck labels to the bottles. The labels are centered, automatically, on one of the panels.

Crowns are used to close the bottles, and an O & J Crowner is synchronized with the labeling machine to produce 70 bottles a minute.

O & J Single Labelers have cut the labeling costs of one prominent manufacturer 49%. This represents an actual saving of $1390 a year for each machine, and at the same time produces a neater and more attractive package.

If you would like to see the Engineering Audit, containing the facts and figures on the operation of this plant, our representative has a copy which he will gladly go over with you in detail.

Other audits also have been prepared of plants using various sizes and types of labeling machines, and the results that they are obtaining. You place yourself under no obligation by having our representative call and show you how others have produced a better package at a substantial saving.

Liquid

O&J LABELING MACHINE CO.

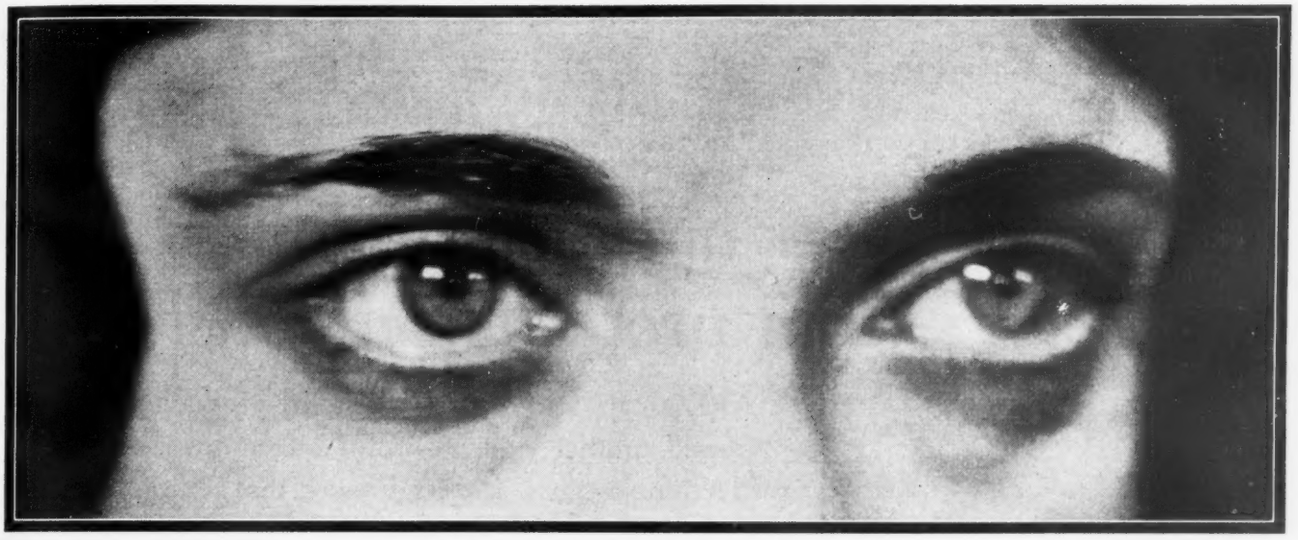
60 Ellsworth Street, Worcester, Mass.

Division of

THE LIQUID CARBONIC CORPORATION

3100 South Kedzie Avenue, Chicago, Illinois

Do eyes say "YES" when they see your packages?



The shopper's eyes must say "yes" when they see your product! Does its packaging help make sales? Owens-Illinois glass containers build quick turnover because of sales-appeal designed into them.

Science tells us that the great majority of our impressions come through the eyes. This is particularly so in the merchandising of packaged goods.

Packers and manufacturers of food products have found that attention to appearance of package, label and carton pay real dividends in increased sales.

The Owens-Illinois Glass Company has been privileged to cooperate in the production of a wide variety of sales-building containers. Our Department of Design has been established to help our customers, either in the choice of stock glass containers or in the design of new ones together with labels and cartons. . . . Owens-Illinois Glass Company, Toledo, Ohio.

May we send you a copy of our booklet, "Putting New Sales Appeal Into Your Packages"?

SEE WHAT YOU BUY

BUY IN GLASS

BRANCH OFFICES—ATLANTA, Ga., *1001-2-3 Norris Bldg.* -- BALTIMORE, Md., *1501-2 Bromo-Seltzer Tower Bldg.* -- BOSTON, Mass., *430 Park Square Bldg.* -- BUFFALO, N. Y., *1133-5 Marine Trust Bldg.* -- CHICAGO, Ill., *402 West Randolph Street* -- CINCINNATI, Ohio, *800-4 East Third Street* -- CLEVELAND, Ohio, *218 Engineer's Bldg.* -- COLUMBUS, Ohio, *Southwood and 19th Sts.* -- DALLAS, Texas, *407-8 Mercantile Bank Bldg.* -- DENVER, Colorado, *306-7 Jacobson Bldg.* -- DES MOINES, Iowa, *330-1 Insurance Exchange Bldg.* -- DETROIT, Mich., *3-112-113 General Motors Bldg.* -- INDIANAPOLIS, Ind., *1233 Meyer-Kiser Bldg.* -- KANSAS CITY, Mo., *2114 Central Street* -- MEMPHIS, Tenn., *1004 Dermon Bldg.* -- MILWAUKEE, Wis., *301 Watkins Bldg.* -- NASHVILLE, Tenn., *1005 Stahlman Bldg.* -- NEW ORLEANS, La., *608-10 Tulane-Newcomb Bldg.* -- NEW YORK, N. Y., *1605-10 Park-Murray Bldg.* -- PHILADELPHIA, Pa., *925-27 Public Ledger Bldg.* -- PITTSBURGH, Pa., *1507 Arrott Bldg.* -- ST. LOUIS, Mo., *1402 Landreth Bldg.* -- ST. PAUL, Minn., *Robert and Indiana Streets* -- SALT LAKE CITY, Utah, *308 Dooly Bldg.*

OWENS-ILLINOIS

GLASS CONTAINERS

The "Big Five" Packers endorse

Dings *High Intensity* MAGNETIC SEPARATION

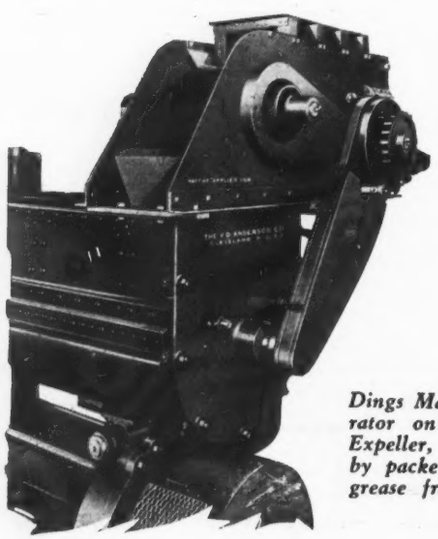
Another industry profiting from protection against iron

LARD, soap, and other packers' by-products is still another industry profiting from the sure protection against iron. Presses that extract grease from inedible parts of cattle break when iron goes through. Dings Magnetic Separators, protecting such equipment, have paid and are paying for themselves over and over again. Hundreds are in service in the plants of the Big Five alone!

Wherever iron can cause defects or impurities in products, wherever materials must be ground, crushed, or pressed, wherever processes produce combustible dusts, Dings pays large returns in cash savings and protection. Check up on the profit possibilities of protection against iron in your own plant.

Boston: 304 Rice Bldg.
Chicago: 273 Seventh Street
New York City: 50 Church Street
San Francisco: 332 S. LaSalle Street

Branch Offices in Other Principal Cities



Dings Magnetic Separator on Anderson Expeller, press used by packers to extract grease from tankage.

Dings Magnetic Separator Co.

703 Smith Street
Milwaukee, Wisconsin
Established in 1899
World's largest manufacturers of magnetic separators

Some of the industries in which 8500 Dings Magnetic Separators are protecting plant and product:

Drugs and Chemicals	Paper
Candy and Sugar	Glass
Cement and Rock	China
Tobacco	Fertilizers
Mining	Packers' Products
Foundry	Grain and Foodstuffs

Tires and Rubber Products

PFIZER'S CITRIC ACID

POWDERED

GRANULATED

CRYSTALS

SODIUM CITRATE

UNIFORM QUALITY

STRICTLY-U.S.P.

EIGHTY YEARS OF MANUFACTURING EXPERIENCE BEHIND OUR PRODUCTS

CHAS. PFIZER AND CO. INC.

MANUFACTURING CHEMISTS

81 Maiden Lane New York N.Y. — Est. 1849 — 444 W. Grand Ave Chicago Ill.

They call it **MATERIALS HANDLING**

In my Department it's **SERVICE**

Service Trucks are regularly mounted over highest grade bearings — Timken, Service and Hyatt, all three are built into the two Service No. 606STH Frictionless Casters in the running gear of this Push E-Z Truck.

"*Sure!* Materials handling, interior hauling, indoor trucking —they all mean moving things *from where they are* to where you *need 'em*, and the quicker the better. That's service. And I long ago caught onto the idea built into Service Casters and Trucks. It means that to service a shop or a bench or a stockroom, the truck has got to deliver the goods. No stalling. And, no back-breaking push to wear my men out by noon-time. My Service Trucks are so old they seem like part of the department, but they're as spry as the youngest youngster who pushes them."

That was Ed Miller speaking, folks, and he suggests that we make you a trial offer to test his opinion. All right. *Write us for the details.*

SERVICE CASTER & TRUCK CO.
525 N. Albion St., Albion, Michigan

Chicago: 603 Washington Blvd. NewYork: 200 Lafayette St. San Francisco: 61 Bluxome St.
England: 15 Mallow St., Old Street, London Canada: Brock & Campbell Sts., Brantford, Ont.

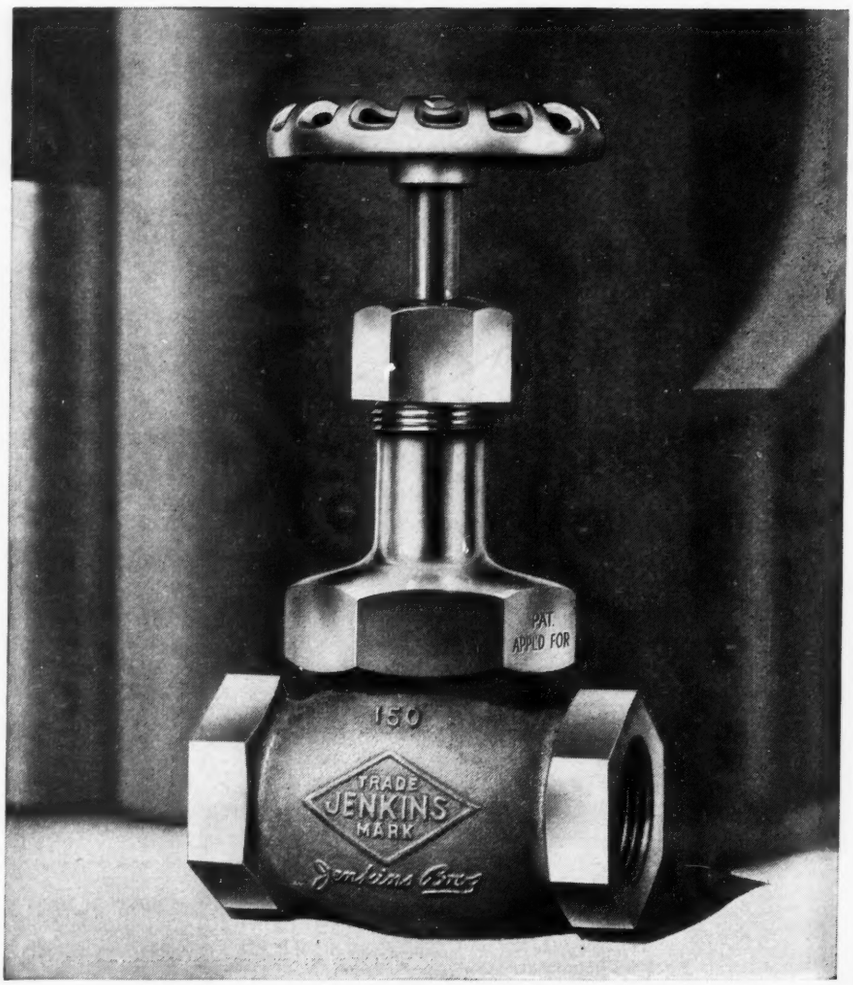
Service
CASTERS & TRUCKS

FIGURE 106-A . . . up to the minute

THIS standard bronze globe valve is the last word in globe valve construction . . . is marked with the Jenkins "Diamond", for 66 years the recognized symbol of valve quality.

Apart from this valve quality, which is traditional with Jenkins, Fig. 106-A has the two advantages of a one-piece screw-over bonnet and a slip-on stay-on disc holder.

One-piece bonnet construction provides unusual strength. The bonnet can be easily removed and replaced *repeatedly* without springing or distorting. Jenkins slip-on stay-on disc holder does not fall off the spindle when the bonnet is removed. *It slips off only when you want it to.*



Above: Fig. 106-A, Screwed, Jenkins Standard Bronze Globe Valve, with one-piece screw-over bonnet and slip-on stay-on disc holder. For 150 lbs. steam working pressure, or 250 lbs. oil, water, gas working pressure.

You should see Fig. 106-A to appreciate its sturdy construction and design. Your supply man will gladly show it to you. Write for Bulletin 141.

JENKINS BROS.

80 White St. New York, N. Y. 524 Atlantic Av. Boston, Mass. 133 No. 7th St. Philadelphia, Pa.
646 Washington Blvd., Chicago, Ill. 1121 No. San Jacinto, Houston, Texas
JENKINS BROS., Limited, Montreal, Canada; London, England.
Factories: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Canada.

Jenkins
VALVES
Since 1864

JENKINS VALVES ARE ALWAYS MARKED WITH THE "DIAMOND"

Refit . . . *from Stock items*

WHILE production is slack, the wise executive is looking over his plant, replacing worn equipment, making changes here and there to gain higher efficiencies, and getting things ready for the reawakening of industry.

To refit from stock items means, not only the opportunity to purchase at lower prices than built-to-order equipment would cost, but it also means *immediate deliveries.*

Every Worthington sales engineer has just received his copy of our latest Consolidated Stock List, showing equipment on hand in our November, 1930, inventory. If what you need is there, you can save money. Simply call the nearest Worthington district office for full information.

WORTHINGTON PUMP AND MACHINERY CORPORATION

Works: Harrison, N. J. Cincinnati, Ohio Buffalo, N.Y. Holyoke, Mass.

Executive Offices: 2 Park Avenue, New York, N.Y

GENERAL OFFICES: HARRISON, N. J

District Sales Offices and Representatives:

G-59

ATLANTA	CHICAGO	DALLAS	EL PASO	LOS ANGELES	PHILADELPHIA	ST. PAUL	SEATTLE
BOSTON	CINCINNATI	DENVER	HOUSTON	NEW ORLEANS	PITTSBURGH	SALT LAKE CITY	TULSA
BUFFALO	CLEVELAND	DETROIT	KANSAS CITY	NEW YORK	ST. LOUIS	SAN FRANCISCO	WASHINGTON

Branch Offices or Representatives in Principal Cities of all Foreign Countries

WORTHINGTON

WORTHINGTON PUMP & MACHINERY CORPORATION, Harrison, N. J.

Gentlemen: Have your representative show me how I can save money by purchasing from your latest Consolidated Stock List.

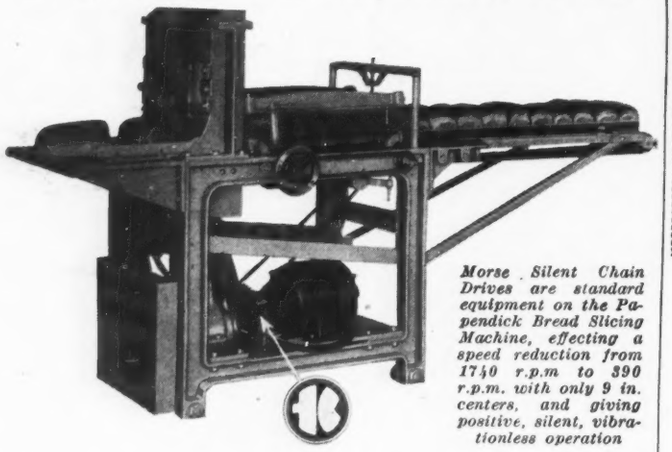
Name _____ *Position* _____

Company _____

Address _____

(P)

MORSE SILENT CHAIN DRIVES *give clean* Power Transmission



Morse Silent Chain Drives are standard equipment on the Papendick Bread Slicing Machine, effecting a speed reduction from 1740 r.p.m to 390 r.p.m. with only 9 in. centers, and giving positive, silent, vibrationless operation

EFFICIENT, quiet running, Morse Silent Chain Drives are ideal for use in plants where cleanliness is an all important factor. There is no seepage of oil or grease from the oil tight cases in which these dependable drives are enclosed. In addition to cleanliness, Morse Drives give maximum service at minimum expense. Due to the extremely short centers they require, they are widely used for individual drives, a decided advantage over lineshafts from the standpoint of efficiency and economy.

Why not investigate the many cost cutting ways in which Morse Chain Drives will save you money. We will gladly have one of our engineers go completely into details with you. Write for free data book and complete information.

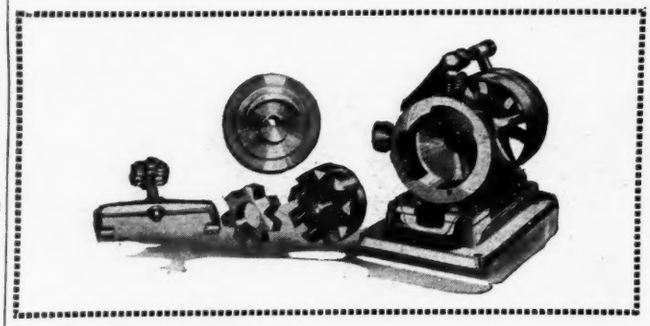
MORSE CHAIN CO., Ithaca, N. Y.

Manufacturers of Morse Silent Chain Drives, Flexible Couplings and Chain Speed Reducers

BRANCHES IN PRINCIPAL CITIES

"Visit the Morse Chain Company exhibit. Booth B-102, American Road Builders Association National Convention, St. Louis, January 10th—16th.

"How easy it is to keep CLEAN!"



A *clean* pump, not just some of the time but all the time! That is the Perfection Rotary Sanitary Pump.

Not only is the Perfection extremely smooth-finished inside but there are only two moving parts and this pump is unequaled for ease of accessibility.

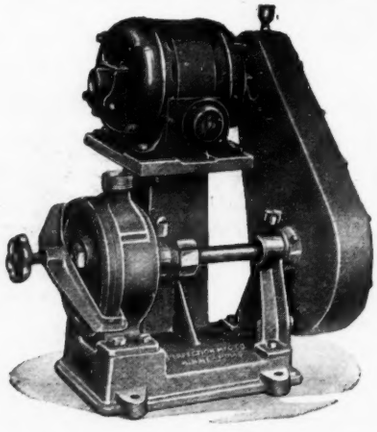
The Perfection Pump combines the best features of both rotary and reciprocating pumps, yet it eliminates the bad features of both.

It is due to the helical gear principle that the Perfection Pump does *not churn* the liquid being handled. The teeth of the helical gears *shear through* the liquid on an angle instead of splashing through head on.

Positive action, steady pulsationless flow, simplicity, durability, economy—these advantages are combined in the Perfection Pump.

Perfection Manufacturing Co.

2186 East Hennepin Avenue, Minneapolis, Minn.



HTH
A Superior Product for Convenient and Accurate Preparation of Bleaching and Sterilizing Solutions
Stable — Readily Soluble — Uniform
The H T H in this package contains 2½ lbs. Available Chlorine
Manufactured by
The Mathieson Alkali Works (Inc.)
250 Park Avenue New York City
HTH

H T H is a dry, stable powder containing 65% of available chlorine. Readily soluble in cold water, its use requires no special equipment. One can of H T H produces 30 gallons of stock hypochlorite solution, containing 1% of available chlorine (10,000 p. p. m.) at a cost of slightly more than 5c per gallon. This stock solution is easily diluted with water to any desired strength, or solutions are made up in small quantities, as needed, from dry H T H.

Leading food plants insure effective sterilization with H T H — at negligible cost!

H T H . . . chlorine in its newest form . . . has met the approval of leading authorities on food plant sanitation. This convenient, easy-to-use hypochlorite is the most effective and dependable sterilizer, deodorizer and disinfectant now available. And H T H solutions are *economical!* At a negligible cost you can now apply efficient chemical sterilization throughout your plant — to all equipment, containers, floors, walls, ceilings. ¶ In milk, butter, cheese, ice cream, bottling, meat and fish packing and scores of other plants, H T H is reducing losses from spoilage . . . saving thousands of dollars in profits. H T H can safeguard profits for you. Write at once for literature and quotations.

A MATHIESON PRODUCT

Send for booklet
"*Food Plant Sanitation*"

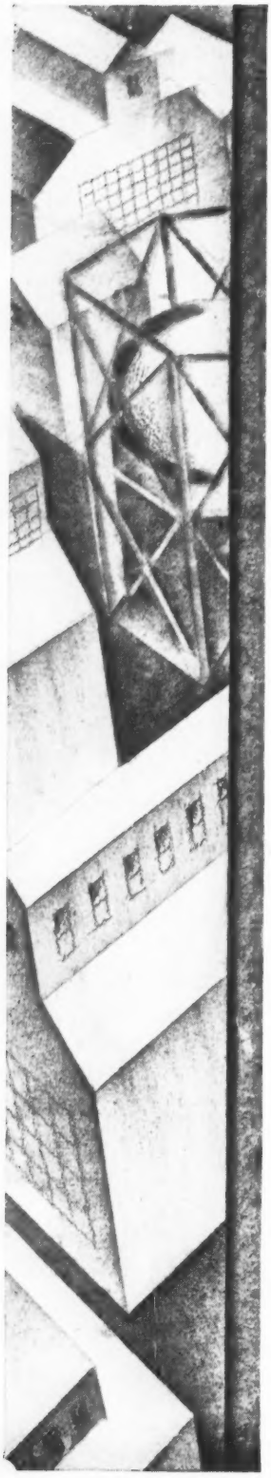
THE MATHIESON ALKALI WORKS (Inc.), 250 Park Avenue, New York City

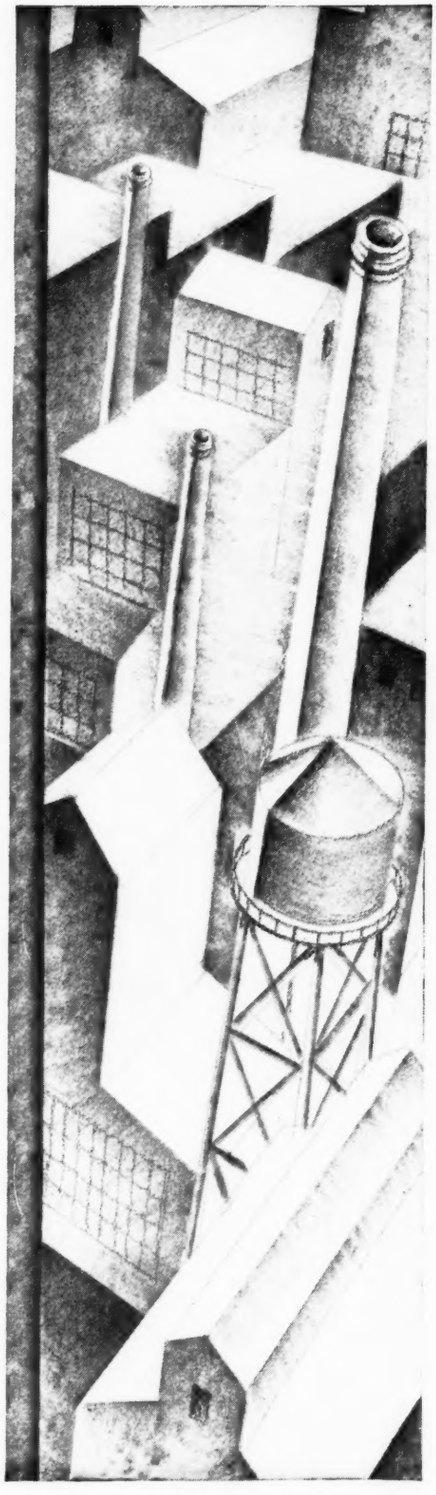
STRONGER THAN STONE OR STEEL

are the foundations of Mathieson's Leadership

By CARL R. MILLER

No. 5 in a series of advertisements describing the position of The Mathieson Alkali Works in the chemical industry





AMONG leading American chemical manufacturers, none has shown more resourcefulness in meeting industry's changing needs... in predetermining future trends in product improvement ... than the Mathieson organization.

It is a well known fact that Mathieson was the first chemical manufacturer to introduce the standard multi-unit tank car, thereby rendering chlorine shipments safer and more economical. Mathieson was a leader in establishing a completely modern plant for manufacturing synthetic ammonia. Purite, fused soda ash, and H T H, high-test hypochlorite, were developed by Mathieson chemists and engineers... modern contributions of a thoroughly modern organization founded on strong foundations of Resources, Research, Service.

Write for a list of available literature describing the development of Mathieson products and their various uses in industry.

The MATHIESON ALKALI WORKS *(Inc.)*
250 PARK AVENUE NEW YORK, N. Y.
Philadelphia — Chicago — Providence — Charlotte — Cincinnati
Works: Niagara Falls, N. Y. — Saltville, Va.
Warehouse Stocks at all Distributing Centers

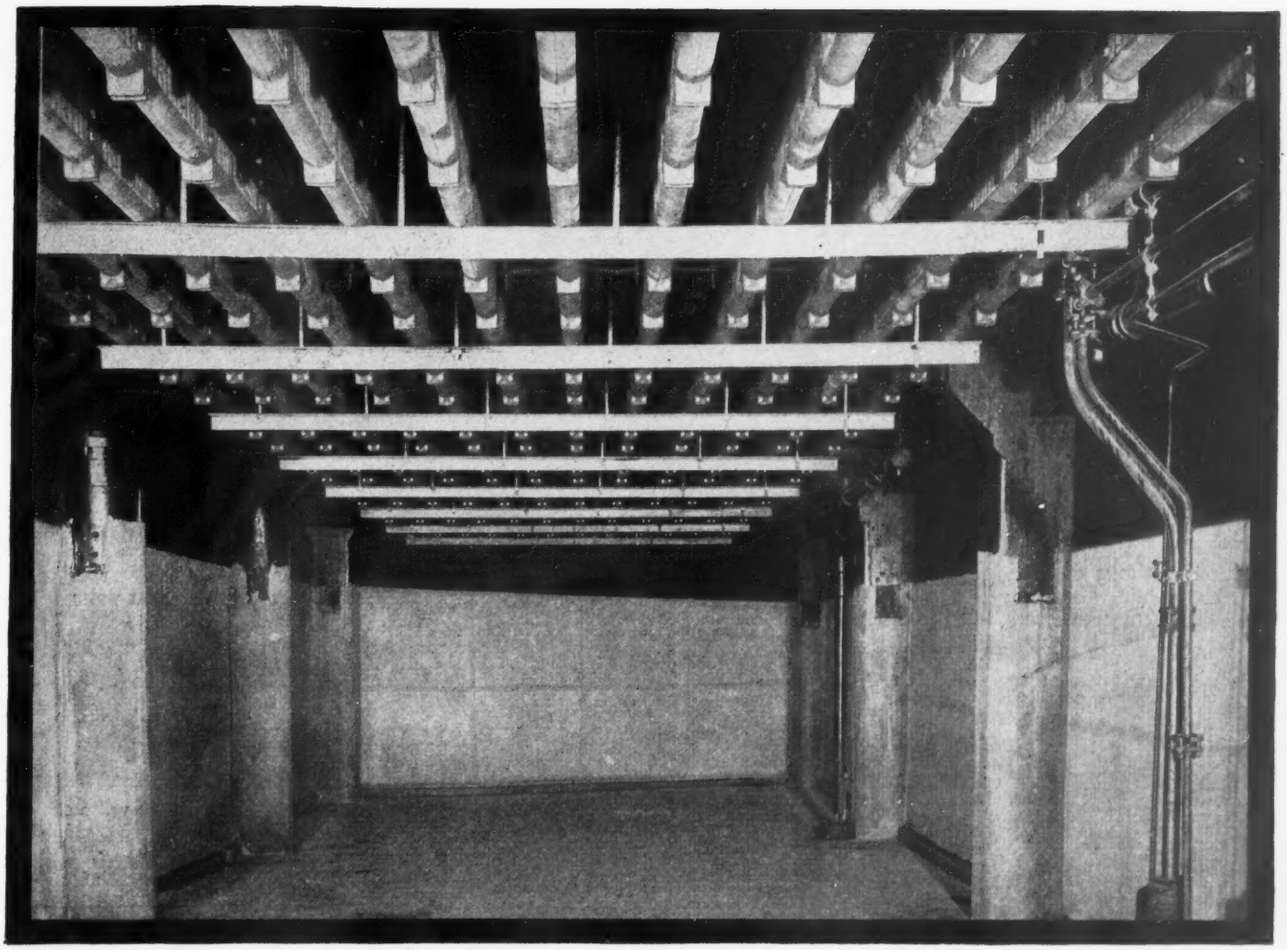
MATHIESON CHEMICALS

Soda Ash... Caustic Soda... Bicarbonate of Soda... Liquid Chlorine... HTH (Hypochlorite)... Ammonia, Anhydrous and Aqua... Bleaching Powder... Sulphur Dichloride... PURITE (Fused Soda Ash)

MATHIESON CHEMICALS
SERVICE
RESOURCES | RESEARCH

Great Structures Rest on Strong Foundations

PRINTED IN U.S.A.



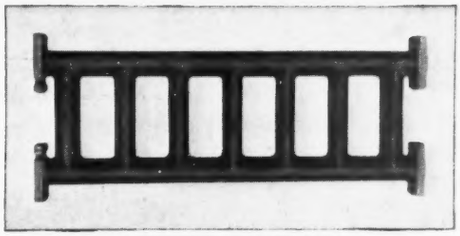
Standard Equipment for many Plants

Refrigerated Room of the Rath Packing Co. Waterloo, Iowa. H. Peter Henschien, Architect

• American Refrigerating Sections are accepted by competent Engineers as standard equipment.

• American Refrigerating Sections are so superior to old-style refrigerating surface in design, operation and efficiency that once you use them you are almost sure to adopt them as *your* standard.

AMERICAN REFRIGERATING SECTIONS



• When considering the type of evaporating surface to install in replacements or additions to your Refrigerating Plant, do not overlook the distinct advantages offered by American Refrigerating Sections.

• A letter or just a card addressed to our office nearest you will bring you full information.

INDUSTRIAL DIVISION

AMERICAN RADIATOR COMPANY

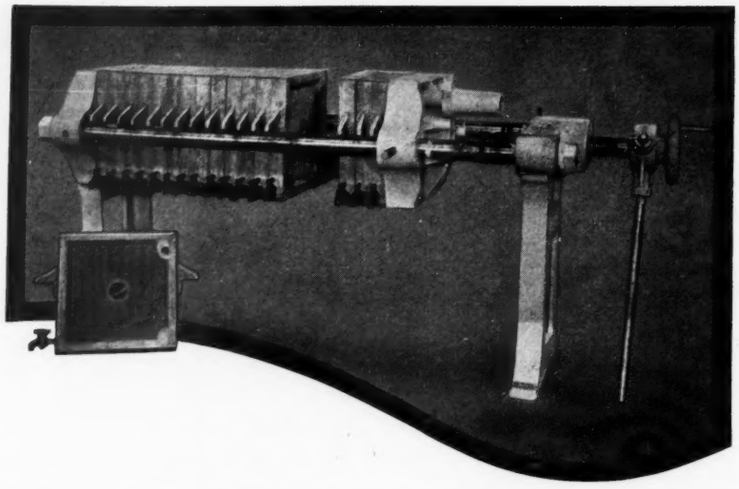
DIVISION OF

AMERICAN-RADIATOR & STANDARD SANITARY CORPORATION

816 South Michigan Avenue, Chicago

40 West 40th Street, New York
4th and Townsend Streets, San Francisco
3251 Wilshire Boulevard, Los Angeles
1206 Fifth Avenue, Seattle

Hard Rubber
recessed plate type
SPERRY PRESS



Solid, hard rubber plates have been used on many Sperry Filter Press installations. It affords many practical advantages over other acid-resisting materials.

Exceedingly long life of rubber plates is one advantage over wood. Their flexibility prevents breakage and damage in handling. It affords an extremely tight seal when the press is closed without damaging filter cloth.

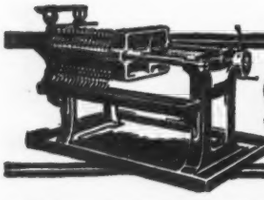
In addition to the plates, all head connections are hard rubber as well as hard rubber cocks, fully protecting the material filtered.

Recessed type plates are used in this instance and are arranged for washing.

It represents another typical Sperry Press built to suit your particular needs and conditions.

Plate type presses are easily made of acid- or alkali-resistant material.

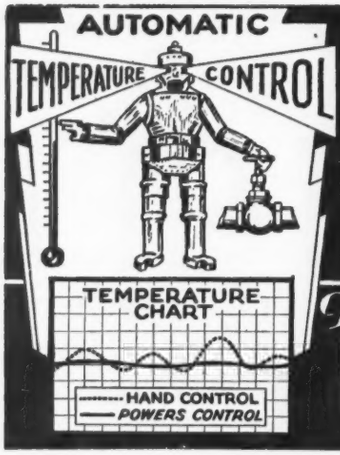
D. R. SPERRY & CO., BATAVIA, ILL.



SPERRY FILTER PRESSES

H. E. JACOBY, 95 Liberty Street
New York

B. M. PILHASHY, Merchants Exchange Bldg.
San Francisco



35 Years of Specialization in Temperature Control

TO ERR IS HUMAN—to eliminate the occasional errors of hand control of temperature with the mechanical accuracy of a Powers Regulator not only speeds up production—but secures a still better and more uniform product. Let our engineers study your problems of temperature control and recommend the type of regulator that will give best results at lowest cost.

THE POWERS REGULATOR CO., 2755 Greenview Ave., CHICAGO
Offices in 37 Cities

The POWERS REGULATOR CO.

• BACK NUMBERS OF FOOD INDUSTRIES ARE NOT AVAILABLE •

Every issue of Food Industries published to date has been over-subscribed within a few days after its appearance, and we still have on hand orders for thousands of copies which we cannot supply. ● We dislike to disappoint anyone wishing a back number, but you will agree that there is no point in our printing a lot of copies that must be ultimately thrown away. We try, insofar as is possible, to limit our production of a particular issue to the demand for it. ● The best way to insure your receiving every copy of Food Industries is to mail your subscription now. Use the convenient coupon . . . 2 years—$3 . . . 1 year—$2. In lots of 5 or more $1.50 each per year.

FOOD INDUSTRIES
10th Avenue at 36th St., New York City

Please enter my subscription for——years at——dollars.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

_____

A VALUABLE BYPRODUCT FROM DRY BREAD

. . . . Another Example of Jeffrey Pulverizer Usefulness

Dry bread—unsalable merely because of dryness need not be a waste. A number of large bakeries are grinding it to crumbs, in a Jeffrey Hammer Pulverizer. The crumbs are salable as such for breading meats. They are also used in the manufacture of self rising pancake flour.

The bread is not of uniform dryness and the ordinary pulverizing methods do not produce the best results.

The Jeffrey Pulverizer is equipped with just the right type of hammer and bar to give a very uniform product when handling whole loaves at tonnage rate.

Jeffrey Pulverizers, Crushers, Shredders and Hashers provide a very wide range of reduction ability. If you will submit your crushing or pulverizing problem to Jeffrey Engineers, they will work out for you an economical, effective set up.

32 Different Materials

Here is a list of 32 different materials now being successfully reduced in Jeffrey Machines.

Algaroba Beans	Cocoanut Shells	Meat Scrap
Apples—for Cider and Vinegar	Cottonseed Cake	Orange Peel
Bone	Cracklings	Oyster Shells
Bread—stale	Egg Shells	Sugar
Cabbage for brant juice	Gelatin—dry	Sugar Cane
Caster Beans	Ginger Root	Salt
Cocoa Beans	Hoofs	Skulls
Cocoa Cake	Horns	Tankage
Cocoa Hulls	Kelp	Tomatoes
	Linseed Cake	Vanilla Beans
	Lemon Peel	Watermelons—for Vinegar
	Meat Cake	

The Jeffrey Manufacturing Company
927-99 North Fourth Street, Columbus, Ohio

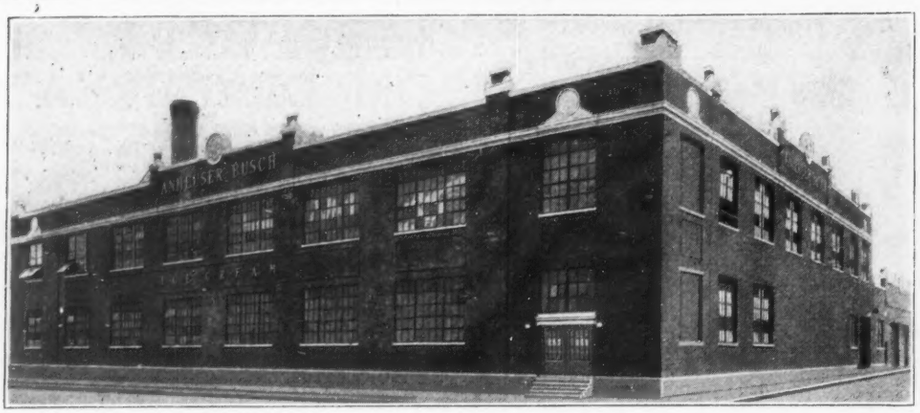
New York	Rochester, N. Y.	Scranton, Pa.	Cleveland	Charleston, W. Va.	Denver	Birmingham
Buffalo	Philadelphia	Boston	Detroit	Milwaukee	Salt Lake City	Houston
Utica	Pittsburgh	Cincinnati	Chicago	St. Louis	Atlanta	

Jeffrey Manufacturing Co., Ltd., of Canada: Head Office, Montreal; Branch Office, Toronto.

JEFFREY PRODUCTS

Elevators—Conveyors
Trolley Conveyors
Portable Loaders
Coal and Ashes Handling Equipment
Chains and Attachments
Sprocket Wheels—Gears
Crushers—Pulverizers
Sand & Gravel Handling, Washing and Screening Equipment
Locomotives

JEFFREY
MATERIAL HANDLING EQUIPMENT



Building and laboratory of Anheuser Busch Ice Cream Co., Inc., Woodhaven, L. I. Equity Construction Co., Inc., New York, engineers and contractors

Absolute Purity . . . *a valuable sales asset!*

THE use of highest quality materials . . . and their protection during manufacture with Bayley Pivoted Windows Screened . . . that has made Anheuser Busch ice cream a big seller. Possessing features not found in any other window of this type, these screened windows are widely used in bakeries, packing houses, candy factories, hotel kitchens, hospitals, dairies and other buildings where foods are prepared, or from which they are distributed, as well as in power houses and textile mills where protection to equipment or products is essential.

These windows operate without movement of screens or flexing of screen contacts. Screens are easily removable, without use of tools, for cleaning windows or for winter storage. Sections 1½" deep, for extra strength, longer life. Quantity production reduces first cost . . . better design reduces maintenance expense.

Bayley thorough engineering service, based on 49 years of experience, is available without cost or obligation. Send for illustrated folders. The William Bayley Co., 146 North Street, Springfield, Ohio.

BAYLEY
STEEL WINDOWS & DOORS

District Offices

Cleveland, 449 Terminal Tower
Washington, 1427 I St., N. W.
Atlanta, 407 Bona Allen Bldg.
New York, 67 W. 44th St.
Boston, 5 Park St.
Chicago, 75 E. Wacker Drive

SHRIVER FILTER PRESSES

SHRIVER GUARANTEE

Shriver superiority is your guarantee of Shriver Filter Press performance. Every filter press that bears the name of Shriver is a product of sound engineering principles and precision manufacture with a long record of improvements and betterments to their credit. Shriver Filter Presses can be bought with complete confidence that they will always represent sterling performance in the service to which they are applied. Shriver Filter Presses are the choice of the food industry. Your inquires are solicited.

T. SHRIVER & COMPANY

Established 1860

860 Hamilton Street Harrison, N. J.

A Filter Press For Every Purpose

SHRIVER

Filter Presses Filter Cloth Diaphragm Pumps

Scores of uses for RICE HULLS

For packing hygroscopic materials to prevent moisture absorption.

For filtering and percolating.

For insulation (hot or cold).

Ground filler for cleaning compounds, fertilizers, insect powders, etc.

Many Advantages

Rice Hulls are clean and "springy." They are light in weight (only 7½ pounds per CUBIC FOOT). They are free-flowing and non-packing (cannot be packed even by mechanical means). They are NEUTRAL IN ODOR.

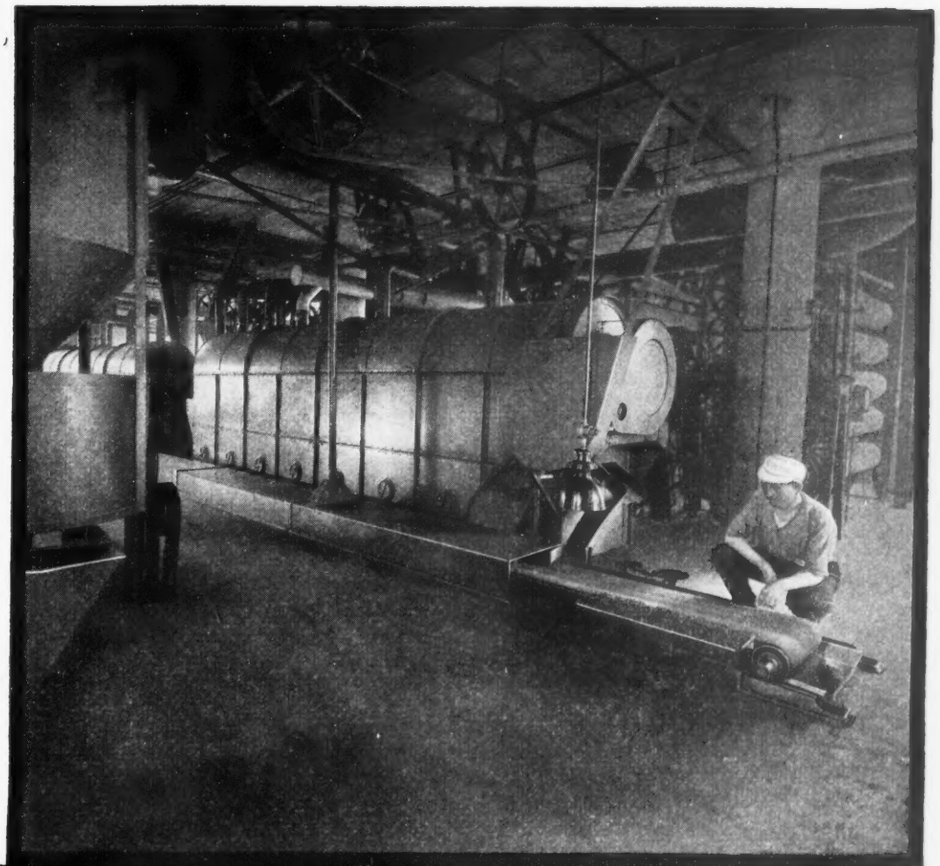
Rice Hulls can be furnished ground also, through and/or over any mesh.

WRITE FOR SAMPLES AND PRICES

Sold sacked or bulk. Minimum weight, 30,000 pound carload. Low in price; economical to use.

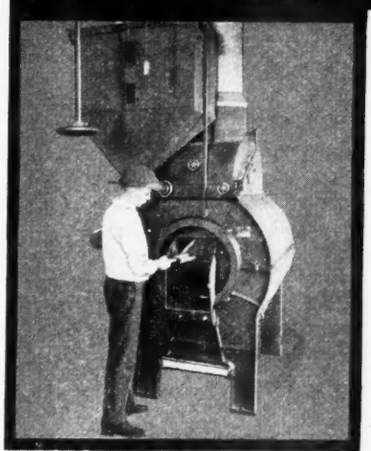
McGILL BROTHERS RICE MILL

STUTTGART, ARKANSAS



(WITH APOLOGIES TO GRAPE NUTS)

"THERE'S A REASON"



says a famous cereal roaster. There's a reason, too, why nine out of ten cereal, coffee and cocoa bean plants "roast with gas". The new illustrated book "GAS HEAT" tells the whole story. Write for your copy of it—free.

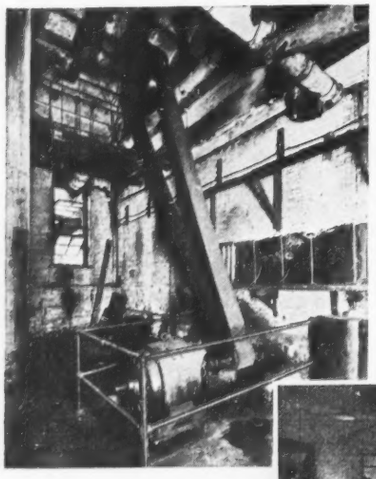
You can do it better with gas regardless of the size of your plant. Consult your local gas company on YOUR requirements.

AMERICAN GAS ASSOCIATION

420 Lexington Avenue, New York

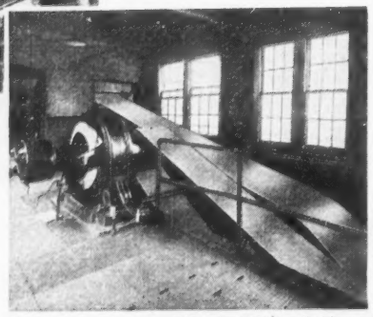
IF IT'S DONE WITH HEAT, **YOU CAN DO IT BETTER WITH GAS**

"The Value of Long Life at no Extra Cost" is the testimony of owner service records...



44 Years of Service

A 12 inch double Schieren Belt transmitting 75 H.P. from an 11 inch motor pulley to a 48 inch pulley. This belt was installed in 1886 and was in constant service until May, 1930.



33 Years of Service

A 42 inch 3 ply Schieren Belt on main engine drive (belt shown at right of photo) transmitting 300 H.P. This belt was run night and day for 12 years and has been in service 33 years. It is still in good operating condition.

The belt on the left which is NOT a Schieren Belt has been in service only 8 years and is already showing signs of disintegration.

DUXBAK LEATHER BELTING

has abolished the old idea that long life is something that costs extra. It doesn't! The extra long life of Duxbak Belting is an added value . . . to you . . . but it costs no more. We secure long life and pliability in Duxbak belting by scouring the leather . . . at very small cost to us . . . and at no extra cost to you. Owner service records testify to the unusually long life THEY find in Duxbak Belting. 47 years, 31 years, 14 years, etc., are actual records of Duxbak in service. It costs no more but it saves so many power transmission dollars. You probably have a few dollars you would like to save. Investigate Duxbak and get your costs down.

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Chas. A. Schieren Company

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40 FERRY STREET NEW YORK

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Send me a copy of folder describing the new Rockwood Short Center Drive.

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Position .....
Company .....
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offered by the

AMERICAN UTENSIL CO.

at the

CANNERS' CONVENTION

TOMATO JUICE EXTRACTOR ! Manufacturers of tomato juice learned a great deal from last season's operations. These experiences are incorporated in an improved *TOMATO JUICE EXTRACTOR* which, by the additions of new non-aerating attachments on our old machine, will more than double its capacity and, we believe, improve the quality.

CHOW CUTTER ! A labor-saving machine for cutting chow or sweet mix will be exhibited. This machine is in separate units which will be sold separately or together. Separately, one unit slices pickles the long way and the other unit slices them cross ways. These cuts are straight across and *not* on the bias. When operated together these units produce the ordinary cut found in sweet mix and many times faster than is possible by hand.

RELISH CUTTER ! In addition to the above, we will exhibit, as we did last year, our *Relish Cutter* which has been very favorably received during the past season and our FRUIT DICER which is recommended as the only machine that will successfullly dice glutenous products, such as citron, orange, and lemon peelings, etc.

AMERICAN UTENSIL CO.
10 So. LaSalle Street
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To help clarify and crystalize the function of air conditioning . . . as applied either to increase human comfort, or to facilitate a manufacturing process . . . is the intent of this bulletin.

Theoretical problems are presented and solved. Calculations of the many factors to be considered, in design and installation, are given in detail. Tables and charts, essential to an accurate determination, are included in Carbondale's Air Conditioning Bulletin.

You will find this literature of considerable interest and assistance: As many copies as needed are yours for the asking. Sign and mail the coupon!

Carbondale Refrigeration

ABSORPTION AND COMPRESSION AMMONIA CARMAC SYSTEMS AND CO_2 COMPRESSION SYSTEMS

THE CARBONDALE MACHINE COMPANY
CARBONDALE, PA.

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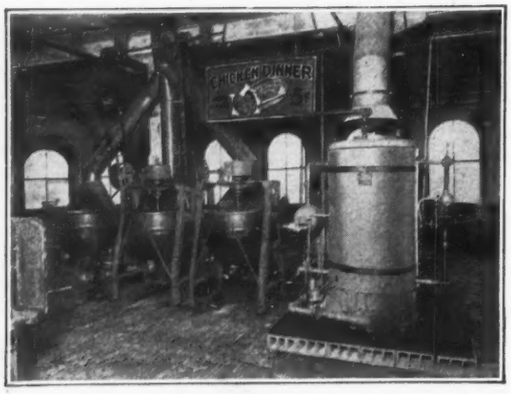
"Independent" Steam!

. . . *is best for Food Processes*



—Upon a careful engineering analysis, it will inevitably be found that processes are best supplied from an independent steam source. Especially is this true of steam for food processes.

Ofeldt gas-boilers give steam of absolute purity at fixed pressures and temperatures, automatically controlled. The compactness of an Ofeldt installation makes it possible to dispose of long pipe lines with attendent uncertainties and inefficiency. Fuel problems, as well as ash disposal and firing, are eliminated with an Ofeldt. Made by pioneers in automatic gas-boiler control, the Ofeldt gives you utter simplicity and unquestionable dependability as a process steam source. *Write for Bulletins!*

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Ofeldt
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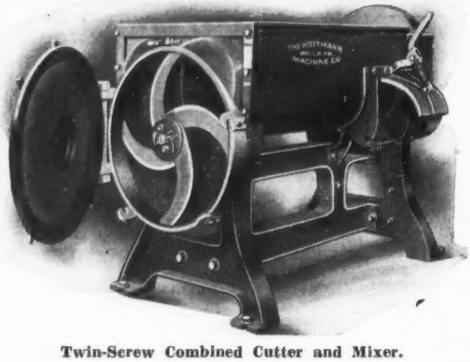
Makers of Automatic Gas Boilers for over a Quarter Century



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EVERY IMPORTANT CANNER OF MEATS, SOUPS, SAUSAGES USES THE **KUTMIXER**

Does better work in less time and at lower cost than any other machine or combination of machines. Cuts and mixes in one operation. Will mix without cutting. Self-emptying. Used by leaders in food industries.

Try it before you buy it.

THE HOTTMANN MACHINE COMPANY
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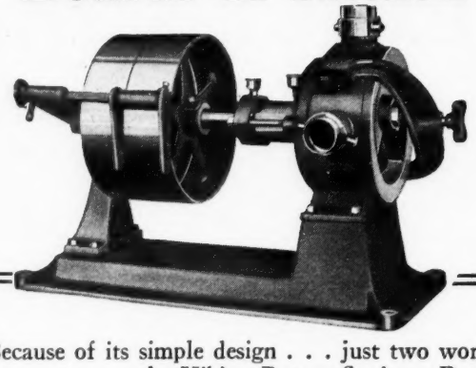
3333 East Allen St., Philadelphia

Approved by all Boards of Health



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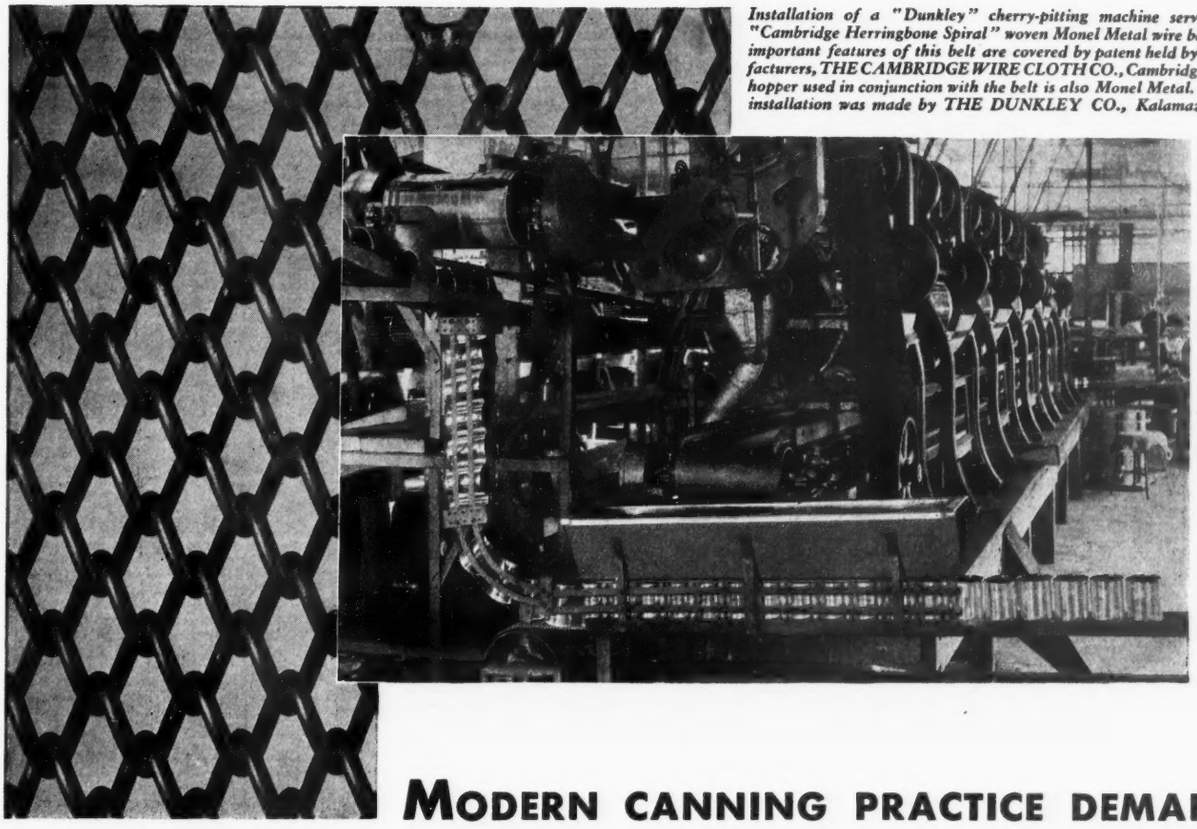
VIKING PUMPS



Installation of a "Dunkley" cherry-pitting machine serviced by a "Cambridge Herringbone Spiral" woven Monel Metal wire belt. Several important features of this belt are covered by patent held by the manufacturers, THE CAMBRIDGE WIRE CLOTH CO., Cambridge, Md. The hopper used in conjunction with the belt is also Monel Metal. The entire installation was made by THE DUNKLEY CO., Kalamazoo, Mich.

MODERN CANNING PRACTICE DEMANDS CORROSION-FREE MONEL METAL WIRE CONVEYOR BELTS

ON account of its higher corrosion-resistance and easier cleanability, Monel Metal is being widely adopted by modern canners for conveyor belts and other vital parts of continuously operating canning equipment.

In many types of equipment such as cookers, dryers, washers, briners and sprayers, Monel Metal woven wire belts are introducing new economies because:

1. They are practically unaffected by the corrosive attacks of food and fruit juices, fruit acids, brines, steam and moisture. They minimize the possibility of product contamination.
2. Monel Metal offers real economy of cleaning labor and insures thorough cleanliness where batch changes occur rapidly.
3. Monel Metal's smooth, close-grained surface will never absorb foreign flavors nor retain stale odors.
4. Monel Metal is rust-proof and strong as steel and has no coating to chip, crack or wear off.
5. Monel Metal retains its modern, inviting appearance through long years of service.

These remarkable properties of Monel Metal are due chiefly to its high Nickel content. Monel Metal is two-thirds Nickel—and Nickel is the whitening, strengthening partner that imparts beauty, durability and corrosion-resistance to Nickel alloys. Ask your regular manufacturer about Nickel alloys—and particularly about Monel Metal.

Visitors to the National Canners' Convention at the Stevens Hotel, Chicago, Jan. 19-25, are cordially invited to visit our exhibit of Monel Metal and Pure Nickel canning plant equipment. Booth No. 132.

MONEL METAL
A HIGH NICKEL ALLOY

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

MONEL METAL

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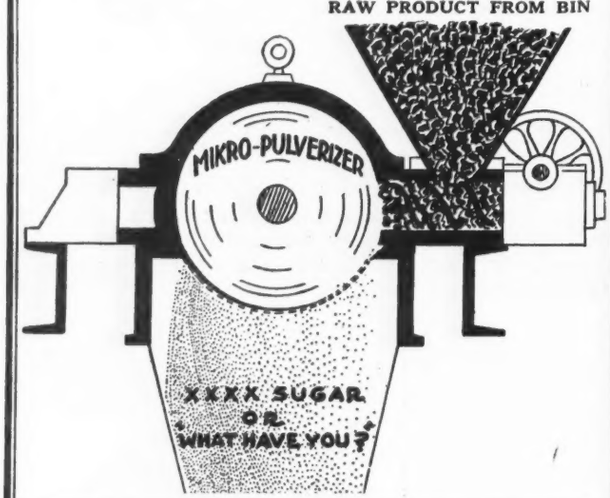
Rockwood & Co.
Thompson's Malted Milk Co.
. . . and practically all the sugar refineries.

RAW PRODUCT FROM BIN



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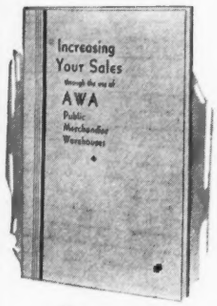

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Costs are based on the number of units of your goods that are handled. Flexibility in controlling costs enables you to expand your business without risk, and make important savings by using our warehouses instead of operating your own branches at fixed overhead.

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Which means that if each person to whom this copy is routed keeps it for only ONE day (and you know they will keep it longer) the last fellow gets it just one MONTH late!

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Vilter experience extends over a period of sixty-four years . . . from the very inception of commercial refrigeration . . . and during all those years Vilter has never failed to keep pace with the changing needs of the food industries. *Naturally* the industries turn to that specialized experience for practical solution of the complex refrigeration problems which confront them today.

With an impressive number of outstandingly successful installations to its credit, Vilter experience prevents grave mistakes and points the way to low-cost installation and operating efficiency. And Vilter not only has national distribution but a maintenance organization nation-wide in scope.

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65-30

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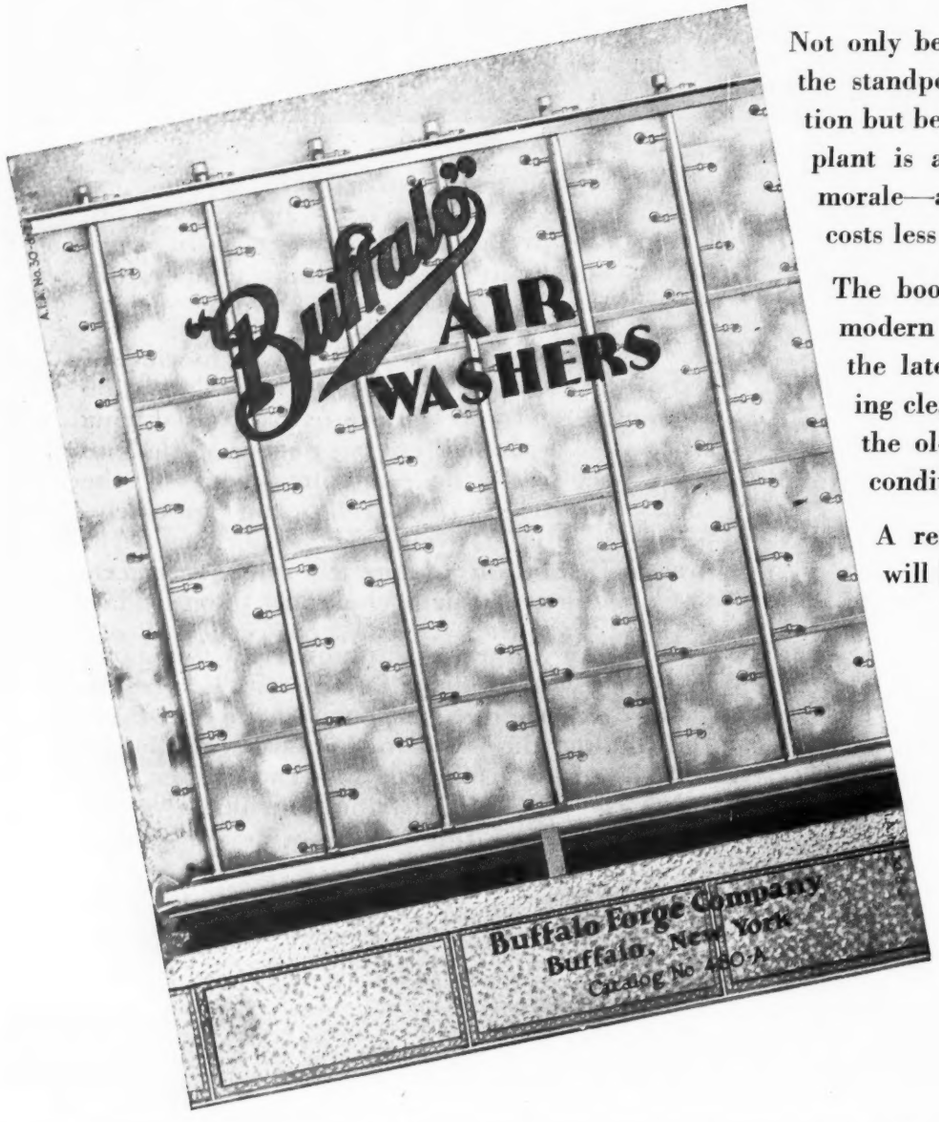
Vilter
SINCE 1867

Clean air is vital to clean foods –



Not only because it is desirable from the standpoint of health and sanitation but because clean air in the food plant is an improver of employee morale—and because in the end it costs less than stale, odorous air.

The booklet shown at the left is modern and complete. It covers the latest equipment for providing clean air—as built by one of the oldest manufacturers of air conditioning equipment.

A request on your letterhead will bring a copy.

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"Buffalo" Air Washers

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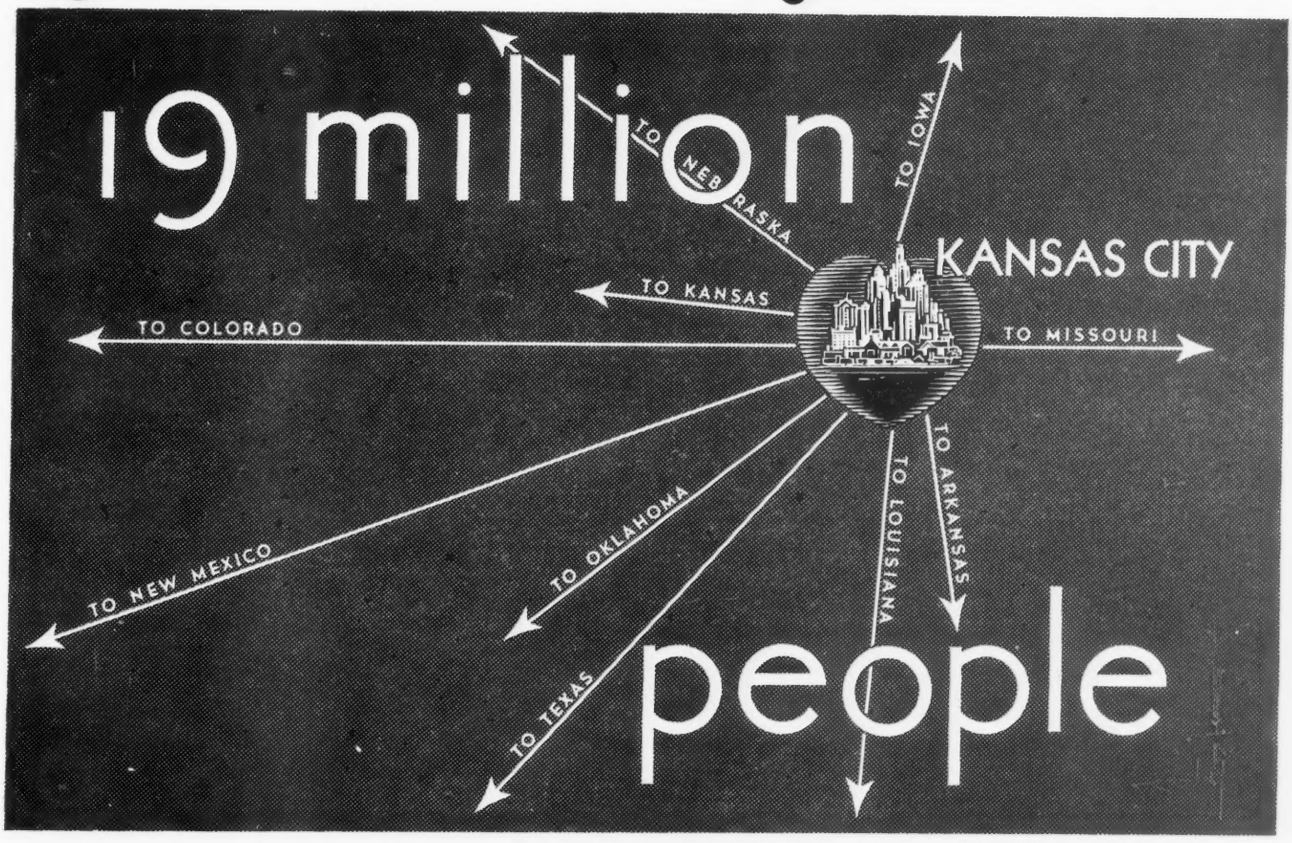

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KANSAS CITY grows amazingly as a distribution center in this period of day-to-day buying. Its manufacturers and wholesalers can ship today's orders today with delivery in many cases tomorrow, *giving promptest service at lowest cost.* And that is just the sort of service a manufacturer must be able to give the retail outlets in this 19-million area. *Long-distance service no longer can compete.*

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The Heart of America

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This industrial character was intensified until today it forms a unique individuality for the city.
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108—16 ft. x 4 in. tubes
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This equipment can be seen in operation. Delivery during month of April, 1931. Being sold due to the fact that we are compelled to move to new site.

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FOOD PLANTS—are generally dependent on the services of the professional consultant for the design of new plants, the perfecting or introducing of new processes, for research work, or for any chemical and scientific work that involves anything outside of ordinary plant routine.
CONSULT the men listed on this page and the opposite page of the "PROFESSIONAL SERVICE SECTION" of FOOD INDUSTRIES when such problems arise.

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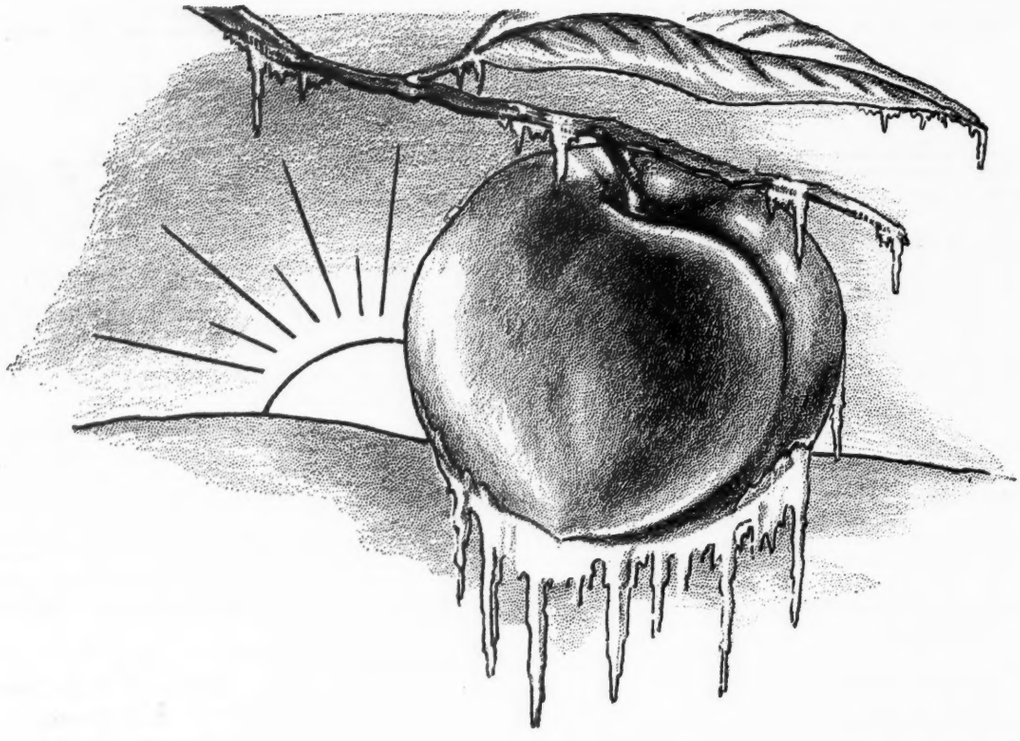
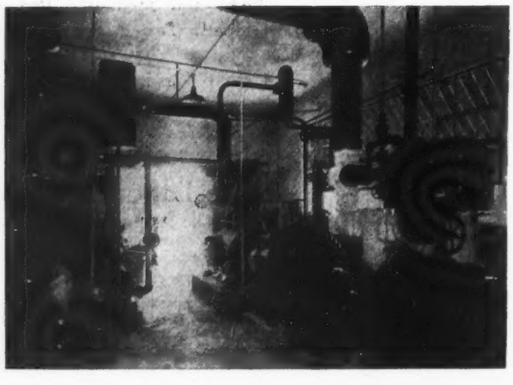


They're freezing in Georgia

AT the new plant of Tom Huston Frozen Foods, Inc., at Montezuma, Georgia, which is designed to handle 40,000 pounds of frozen fruit per 24-hour day, they are freezing those delicate, tasty Georgia peaches by the new quick-freeze process to help level the seasonal over-supply peaks.



A 45-ton Frick CO_2 compressor and an 80-ton Frick ammonia compressor driven by a Westinghouse Type HR High Efficiency Synchronous Motor in the New Plant of Tom Huston Frozen Foods, Inc.

All through this plant modern machines are helping to prevent flooded markets and unprofitable prices—formerly a seasonal occurrence—by making possible the off-season sale of "Frosty Morning" peaches.

And Westinghouse motor drives with their many distinctive features, such as drip-proof construction, sealed-sleeve bearings, dual-protected windings, and directed air circulation, are doing their share by supplying dependable power to these machines.

This is but one example where Westinghouse motor drives are helping pioneer the way to newer and better methods of manufacturing and processing foods.

Westinghouse engineers, with their knowledge of the newest and best methods of applying electricity in food plants, are available to you at all times. Write our nearest district office.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

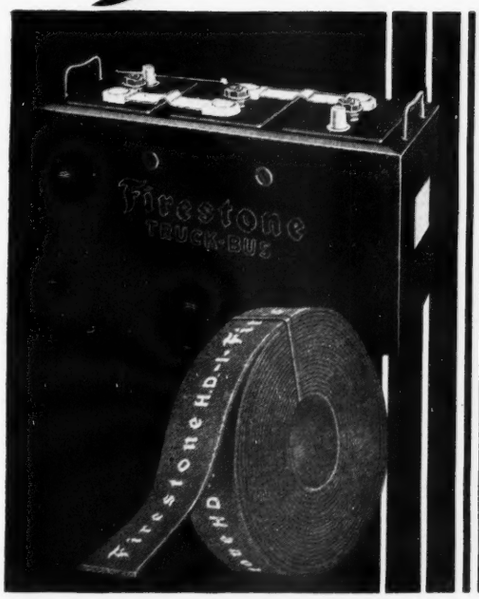
T 31666

TUNE IN THE WESTINGHOUSE SALUTE OVER THE N. B. C. NATION-WIDE NETWORK EVERY TUESDAY EVENING.

Three Times *the* Mileage *with* ROAD DELAYS PRACTICALLY ELIMINATED

THREE times as many buses as they operated in 1926! Three times the mileage, amounting to more than three million miles. And yet since Firestone Gum-Dipped Truck and Bus Tires were adopted by the Washington Railway and Electric Company, four years ago, road delays have decreased from 254 a year to a mere 27—*having been practically eliminated.* During this time the bus miles operated per tire failure have been *increased from 7300 to 120,542*—an increase of over 16 times the average of 1926.

Firestone



WHAT truly amazing evidence of the rapid strides that Firestone has been making in the improvement of Truck and Bus Tires! What eloquent testimony to the results which are being secured by Firestone's careful supervision of the use and care of its products—not for just a single year or two—but continuously over a long enough period of years to make a real test. And all this is but one of the many similar cases where owners of the country's largest fleets are depending on the Firestone Organization for more economical, less interrupted fleet operation. With Firestone Tires, Tubes, Batteries, Brake Lining and Rim equipment, you can profit by the broad experience of the Firestone Dealer, in the proper adaptation and care of your Truck or Bus equipment.

Specify Firestone Gum-Dipped Tires and Firestone Rims when purchasing new equipment.

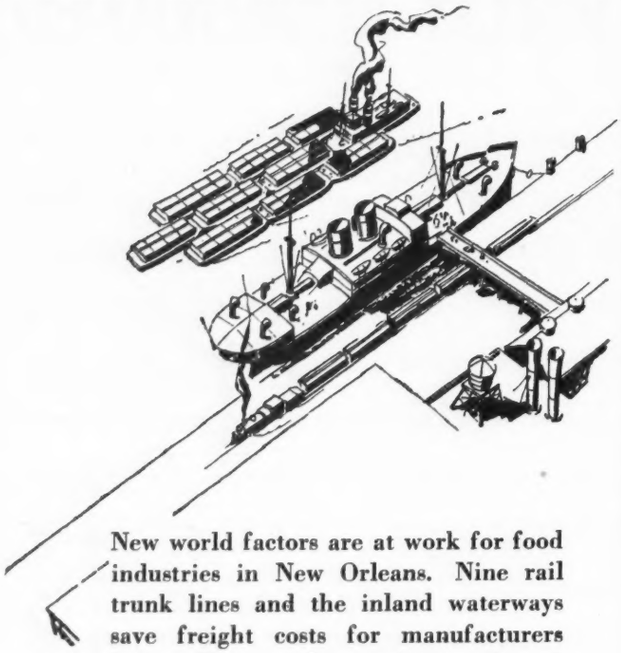
TIRES - RIMS - BATTERIES - BRAKE LINING

Copyright, 1930, The Firestone Tire & Rubber Co.

Suppose

your Competitor

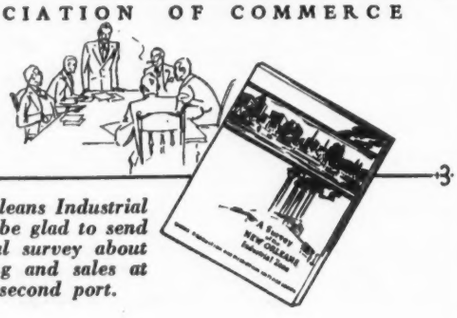
read this advertisement



New world factors are at work for food industries in New Orleans. Nine rail trunk lines and the inland waterways save freight costs for manufacturers here. The nearby territory raises 4 crops during the year . . . and Latin America sends her fruits and vegetables to this "meeting place of the Americas." New markets in Latin America, suffering less from world depression, are buying products made in New Orleans, their sister city. A nationally known executive recently said, "The nation's industrialists are watching New Orleans." Do you know all the interesting possibilities for food manufacturers? Your best competitor may be investigating them now.

NEW ORLEANS

ASSOCIATION OF COMMERCE



The New Orleans Industrial Bureau will be glad to send you a special survey about manufacturing and sales at the nation's second port.

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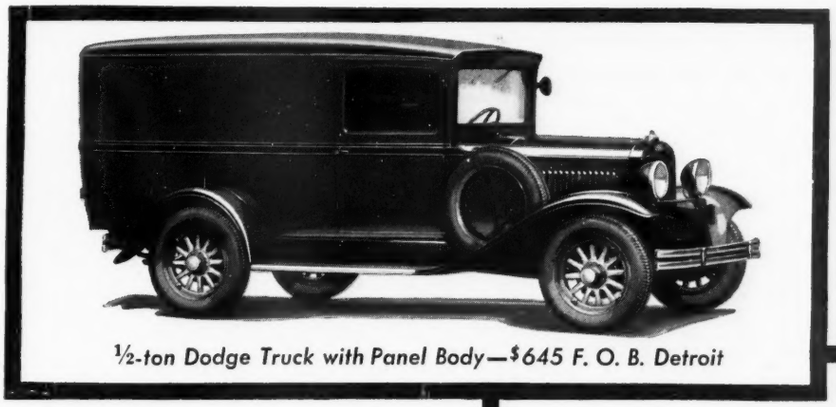

½-ton Dodge Truck with Panel Body—$645 F. O. B. Detroit

1½-ton Dodge Truck with Stake Body—$790 F. O. B. Detroit

FOR MERCHANTS WHO WANT GREATER PROFIT IN 1931

Thousands of progressive food distributors will increase their 1931 profits . . . by more judicious buying . . . by effecting higher turnover . . . by saving a cent or more on every delivery made. » » For these distributors Dodge Trucks will do an able job by cutting delivery costs. Because they are dependable—in name and in fact . . . because they save on gas, oil, tires and repairs . . . because they serve long . . . because they are attractive, speedy, safe and easy to handle.

. . .

See, inspect and drive the type that fits your needs. Buy it complete with body. Count on it for more work and profits.

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS —PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING THE 1½-TON CHASSIS AT . . .

$595

DUAL REAR WHEELS AT SLIGHT EXTRA COST

DEPENDABLE DODGE TRUCKS

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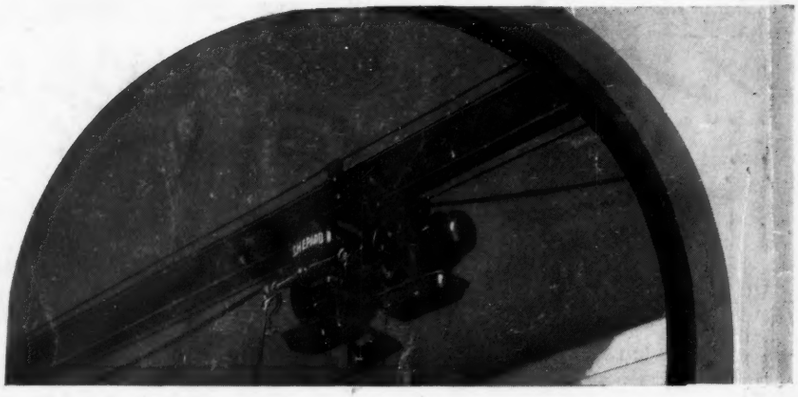
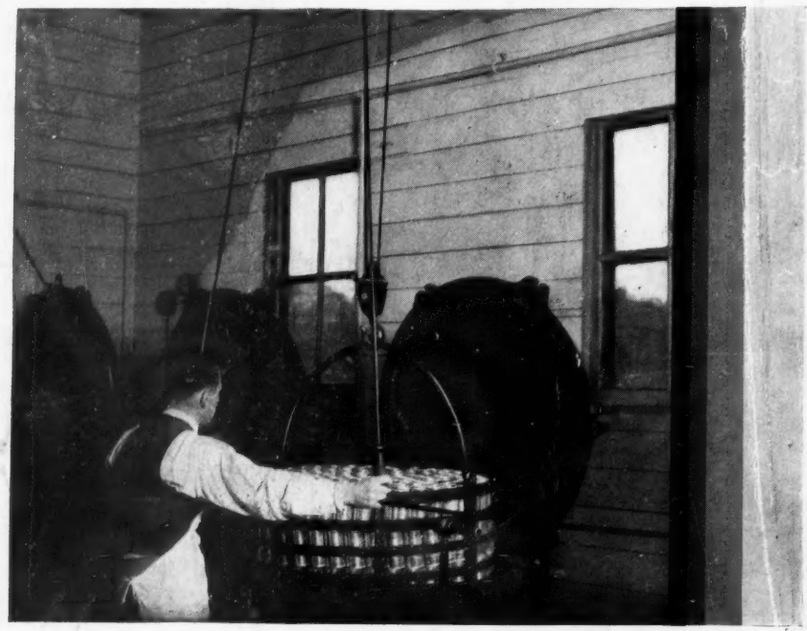


Pure cans for PURE FOOD . . .



with the aid of a SHEPARD

SPEEDING heavy baskets of cans from storage to washing tanks, to sterilizer, to cannery, has been a steady job for this Shepard Hoist for years, at the Pure Food Co., Mamaroneck, N. Y.

Long hours and heavy work day after day, have worked no hardship on the Shepard Hoist. Nor has steam and heat had the slightest effect on the tightly sealed mechanism. Balanced Drive . . . automatic oil bath lubrication . . . permanent alignment have assured years of low cost service.

Assign a Shepard to your load handling job! Whether you require a long lift, high speed, close clearance, and whatever the capacity—Shepard builds a Hoist for the job. A letter to Montour Falls will bring our nearest representative. promptly.

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